# APPENDIX A

## RECORD OF DECISION

# SELECTED REMEDIAL ALTERNATIVE FOR THE SHIAWASSEE RIVER SITE HOWELL, MICHIGAN

# Statement of Basis and Purpose

This decision document presents the selected remedial action for the Shiawassee River Site in Howell, Michigan, which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the administrative record for this Site.

# Assessment of the Site

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action in this Record of Decision (ROD), may present an imminent and substantial endangerment to public health, welfare, or to the environment.

# Description of the Selected Remedy

This ROD addresses the final action at the Site. The selected remedy consists of the following components:

Excavation and disposal of PCB-contaminated soil at the former Cast Forge Company (CFC) facility and excavating or dredging contaminated sediment and river floodplain soils along the Shiawassee River. An estimated 795 cubic yards of contaminated soil would be excavated from the CFC facility to meet the preliminary remediation goal (PRG) of 10 mg/kg. Institutional controls will be placed on the CFC facility property to ensure that it remains zoned industrial. The river sediment would be remediated to 5 mg/kg PRG for the first mile only, requiring excavation of approximately 1,590 cubic yards. In addition, one hotspot located in the second mile at Transect 25 where PCBs were found at 100 mg/kg in 1999, will also be remediated to 5 mg/kg. Remediating the floodplain soil to meet the 10 mg/kg PRG would require excavation of approximately 1,755 cubic yards of contaminated soil. Post remediation monitoring (PCB sampling of the river sediment and floodplain soil) will be required to ensure that natural recovery of the river is occurring.

Excavated soil and sediment containing PCBs at concentrations of 50 mg/kg or greater would be disposed of at an off-site TSCA landfill facility, and soil and sediment containing PCB at concentrations of less than 50 mg/kg would be disposed of at an off-site sanitary landfill facility.

# Statutory Determinations

threat, the preference for treatment does not apply to this remedy. applicable or relevant and appropriate to the remedial action, and is cost-effective. Because the human health and the environment, complies with Federal and State requirements that are legally PCB contaminated material at the site is considered a low level threat rather than a principal The remedial action, which deals with the contaminated soil, and sediment, is protective of

that the remedy continues to provide adequate protection of human health and the environment. Because this remedy will result in hazardous substances on-site above health based levels, a review will be conducted within five years after commencement of the remedial action to ensure

# Data Certification Checklist

The following information is in the *Decision Summary* section of this ROD. Additional information is in the administrative record file for this Site.

- Baseline risk represented by the COCs Chemicals of concern (COCs) and their respective concentrations
- Cleanup levels established for COCs and the basis for the levels
- Current and future land and ground-water use assumptions used in the baseline risk assessment and ROD
- selected remedy Land and ground-water use that will be available at the Site as a result of the
- costs; discount rate; and the number of years over which the remedy cost estimates are projected Estimated capital, operation and maintenance (O&M), and total present worth
- Decisive factor(s) that led to selecting the remedy (how the selected remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria)

# State Concurrence

concur with this Record of Decision. The State of Michigan has not yet taken a formal position regarding the remedy set forth in this ROD. Consistent with the NCP, U.S. EPA provided the State of Michigan with an opportunity to

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# Decision Summary for the Record of Decision Shiawassee River Howell, Michigan

# I. Site Name, Location, and Description

The Shiawassee River Site (Site) includes the former Cast Forge Company (CFC) facility (now called Hayes Lemmerz) 22440 West Highland Road, in Howell, Livingston County, Michigan and an approximate eight miles of the Shiawassee River downstream to the Steinacker Road area (see Figures 1 and 2). Investigations of the extent of contamination have extended about 40 miles of the South Branch of the Shiawassee River northward to the Shiawasseetown Reservoir. The Remedial Investigation Report (1992) identified several areas on the former CFC facility that were historically associated with various waste handling and disposal processes. These areas are as follows: an initial unlined lagoon; a former settling tank and discharge pipe; a former lined lagoon, overflow ditch, and overflow lagoon; and a former discharge area. The CFC facility covers about 51 acres and is bordered on the north and east by wetlands, on the west by the South Branch of the Shiawassee River, and on the south by Highway M59. The portion of the river significantly affected by the polychlorinated biphenyls (PCBs) contamination begins at Highway M59 and proceeds downstream in a northerly direction to Steinacker Road. The floodplain adjacent to the affected portion of the river has been contaminated to some extent by river sediments containing PCBs that were carried over the river bank during periods of high flow.

The South Branch of the Shiawassee River is bordered by forested floodplains, rural areas, and wetlands. The river ranges from about 20 to 45 feet wide. Residences are located along the river. No PCB contamination has been found at any of the residences located along the river.

# II. Site History and Enforcement Activities

# A. Site History

The industrial property at 22440 West Highland Road (M-59) was owned and operated by the Hoover Ball and Bearing Company from 1964 until 1969. The Cast Forge Company (Cast Forge) purchased the site in 1969 and produced aluminum wheels there until 1981 when the property was sold to Kelsey Hayes/Western Wheel.

Cast Forge used hydraulic oils containing PCBs during the production of die cast wheels. Based on available records, it is believed that during the years 1971 and 1972, Cast Forge used significant quantities of Monsanto Pydraul 312 and Pydraul 312A. The primary component of the two fluids is Aroclor 1242, which is one of the many PCB compounds. It is also believed that Cast Forge purchased 112,500 pounds of Pydraul 312 and 312A. In 1972, the plant changed to a phosphate ester lubricant, but residual PCBs remained in the die-casting equipment until 1976 when it was reportedly removed by flushing.

During the period from 1969 through 1974. Cast Forge discharged process cooling water contaminated with PCB-containing oils to an unlined lagoon located to the north of the Cast Forge Plant. The lagoon periodically overflowed to an on-site drainage ditch, which led directly to the Shiawassee River. In addition, historical information and aerial photographs show that solids from the lagoon were collected and spread on the ground in the area east of the former lagoon.

In 1973, the Michigan Department of Natural Resources (MDNR) became aware of two unauthorized discharges to the river from the Cast Forge facility. The oily waste discharges prompted MDNR to direct Cast Forge to close the unlined lagoon and replace it with an underground settling tank. While the settling tank was effective in controlling solids in the waste stream, it would on occasion overflow into a storm drain leading to the river. As a control measure, hay bales were placed at the outfall in an attempt to absorb the oils.

MDNR conducted a routine stream sediment sampling survey of the South Branch of the Shiawassee River in 1974 and found elevated levels of PCBs. In 1975, MDNR identified the Cast Forge Plant as the primary source of the PCB contamination. In 1976, Cast Forge reported that they had complied with the request of the Michigan Water Resources Commission to flush their equipment in order to remove any residual PCB. During this period (1974 to 1977), Cast Forge also modified their wastewater system to eliminate the use of the settling tank, replacing it with a synthetic-lined lagoon with a discharge pipe to the wetland area east of the plant buildings.

In April 1977, MDNR staff found that Cast Forge was discharging its process wastewater from the lined lagoon to an area north of where the former unlined lagoon had existed. MDNR ordered Cast Forge to cease the discharge. In response, Cast Forge modified their wastewater system to include an unlined overflow ditch and an overflow lagoon. This modification was an interim measure until a wastewater containment system, constructed inside the building in October 1977, could be placed into service. Thereafter, process wastewater was transported offsite for disposal.

In 1977, MDNR performed sediment and fish sampling in the river. Sediment concentrations of PCB ranged from 43.7 mg/kg (dry weight) near the site (Marr Road) to 0.6 mg/kg (dry weight) in the Shiawasseetown Reservoir. All fish species (including Carp, Minnows, Northern Pike, Black Crappies, White Suckers, Sunfish, Rock Bass, and Bluegills) collected downstream of Cast Forge for a distance of 10.5 miles, contained PCB concentrations above the federal Food and Drug Administration (FDA) recommended safe limit (2 mg/kg). The principal PCB detected was Aroclor 1242. PCB concentrations (40 to 45 mg/kg, wet weight basis) were generally highest in fish collected closest to the site (at Marr Road), although a single carp collected approximately 20 miles downstream contained 240 mg/kg (wet weight). Small fish (Minnows, Sunfish) were analyzed whole, while portions of a filet were taken from larger fish for analysis.

In 1978, another unauthorized discharge from the Cast Forge facility to the river was reported. Subsequent investigation by MDNR in February 1979 found Aroclor 1248 in several soil

samples collected on the Cast Forge property. One sample was found to have a concentration of 41,000 mg kg. Yet another unauthorized discharge occurred in March 1979, which prompted MDNR to install three monitoring wells around the lined lagoon. Sampling from the wells showed low concentrations (0.2 ug/l of Aroclor 1254, and 7.3 ug/l of Aroclor 1242) of PCBs in groundwater to the north and to the east of the lagoon, respectively.

In 1980, Cast Forge hired Environmental Research Group. Inc. (ERG) to replicate previous MDNR investigations. ERG installed two monitoring wells and collected soil and groundwater samples for analysis. No PCBs were detected in the groundwater, but soil contamination was found at a depth of eight feet in the area of the former storm drainage ditch. A second investigation in the river, from the plant to a distance of ten miles downstream, conducted by ERG during 1980, found PCB Aroclors as high as 150 mg/kg (dry weight) in sediment samples and sediment contamination above 1 mg/kg (dry weight) over the entire reach. In sediment, Aroclor 1242 was reported as the most frequently occurring PCB, while Aroclors 1248 and 1254 were also detected.

MDNR fish sampling efforts in June, 1981, found high concentrations of PCBs in samples collected from 1 to 10.5 miles downstream of the Cast Forge Site. Sediment sampling in the river conducted in June, July, and October of 1981 also detected PCB contamination. In July 1981, the Livingston County Health Department posted warnings against the human consumption of fish from the South Branch Shiawassee River from Howell downstream to Owosso, Michigan.

On June 19, 1981, the Michigan Attorney General executed a Consent Judgement with <u>Cast Forge</u> that had been under negotiation since 1977. The judgement directed that Cast Forge undertake the following actions at the plant site and in the affected river:

- Reroute the existing storm drain north of the plant building;
- Install soil erosion protection (a berm);
- Remove PCB-contaminated muck from the discharge area west of the plant and from the river;
- ° Remove the lined lagoon including standing water, sediments, and the plastic liner;
- Remove contaminated soil from the flatlands area;
- Properly transport and dispose of all contaminated material at an off-site facility; and
- Pay to the State of Michigan \$700,000 in natural resource damages and \$50,000 to reimburse the state for costs incurred in cleanup actions in the river.

The overflow lagoon and spillway were removed prior to issuance of the Consent Judgement.

A-1 Disposal of Plainwell. Michigan was contracted to undertake the cleanup of the plant site during July and August of 1981, under MDNR oversight. A second cleanup contract was awarded to A-1 Disposal in January 1982 to address the discharge area west of the plant and the river. The goal of this project was to reduce the concentration of PCB contamination in stream sediments for a distance of approximately eight miles downstream of Cast Forge. A backhoe was used to remove PCB-contaminated material from around the discharge area and a dragline was used to remove contaminated sediments from an area in the river near Bowen Road. Vacuum extraction via a series of hoses and tanks was also used to remove the PCB contaminated sediments from the river. As most of the PCBs were determined to be tied up in organic material in the river, the vacuum action focused on removing the organic material without taking in the surrounding sand and gravel material. This sediment removal took place primarily in the section of the river between the Cast Forge facility and Bowen Road. Solids from the vacuum operation were removed by a filtration system, which included three filters in series. The dewatered solids and spent carbon from the filters were then transported to a licensed landfill permitted to take PCB-contaminated wastes of this type.

The removal effort resulted in the collection of an estimated 2,531 pounds of PCBs in 1,805 cubic yards of river sediment and 500 cubic yards of sand and gravel used as filter media. Pursuant to the federal PCB Spill Cleanup Policy, 40 CFR, 761.60, and the Toxic Substances Control Act (TSCA), the contaminated sediments, sand, and gravel were segregated into two fractions based on concentration. Solids with PCB concentrations of 50 mg/kg or greater (approximately 260 cubic yards), were segregated from approximately 2,045 cubic yards of solids having lower PCB concentrations which did not subject them to TSCA standards. These materials were transported off-site for disposal at an approved licensed landfill. Although the sediment removal project was intended to clean up a total of eight miles of the river, it ended at the end of 1982 after extending only 1.5 miles downstream, due to the costs of the removal being higher than anticipated.

Fish sampling was conducted by the MDNR, Surface Water Quality Division, in July 1985. The sampling was conducted at two locations downstream: Byron Road, approximately 9 river miles downstream of the Cast Forge property, and New Lothrup Road, approximately 1.5 river miles downstream of the confluence of the South Branch Shiawassee River with the Shiawassee River. PCB concentrations continued to exceed the FDA 2.0 mg/kg safe for fish at both the Byron Road and New Lothrup Road locations.

Fish tissue samples were also collected by MDNR during 1986 in the vicinity of Chase Lake Road. Results of the sample analyses indicated PCBs at concentrations greater than the FDA safe limit of 2.0 mg/kg in 18 of 20 fish samples. The highest concentrations were found in Carp, which ranged from 4.9 to 45.0 mg/kg PCBs.

# **B. CERCLA Enforcement**

Notice letters informing potentially responsible parties (PRP)s of their potential liabilities and offering them the opportunity to perform the Remedial Investigation (RI)/Feasiblity Study (FS) were mailed via certified mail on April 16.1986 to 9 PRPS, including the Site owners, and former owners and operators. Later in 1986, the U.S. EPA decided to use Federal funds to conduct the RI/FS due to the PRPs' refusal to participate. The PRPs based this refusal on the prior remediation performed and because the State of Michigan's indemnification of Multifastener Corporation (successor company to Caste Forge) for any future liability.

# III. Highlights of Community Participation

STATE REMOVAL ACTION: Prior to the 1982 sediment removal by the MDNR in the South Branch of the Shiawassee River, property owners along the river were contacted via mail to inform them of the removal action. Local and regional news media announced the removal action. A public meeting was held at the Howell Recreation Center in Howell, Michigan on March 6, 1982. The project was described and explained to the attendees, and questions were answered. Contacts with the MDNR and Livingston County Drain Commissioner were established for people to ask questions or to report problems during the course of the removal project.

SUPERFUND PROCESS: The MDNR held a public meeting on September 24, 1987 in the Howell Township Hall to discuss the upcoming RI/FS which was to be conducted under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). A Fact Sheet was issued to provide the community with information regarding the investigation at the Site. The MDNR also announced the establishment of a Site information repository at the Howell Carnegie District Library, 314 W. Grand River, in the city of Howell, to make information about the Site available to the public. All documents produced under the Superfund program were placed into the repository for the public to review. On July 17, 1991, the MDNR hosted an informal public meeting at the Howell Carnegie District Library to discuss the ongoing RI/FS study. A brief overview of the Site history, as well as the work completed at the Site and the current status of the Site along with a time-line for completion of the study was presented and discussed with residents. In addition to the presentation, a discussion was held on the advisory regarding fish consumption issued by the Department of Public Health. Once again, a Fact Sheet was prepared and distributed to the mailing list and at the meeting to summarize information on the status of the RI/FS.

On August 25, 1998, the Michigan Department of Environmental Quality (MDEQ) sent out a Proposed Plan announcing a public meeting and 30-day public comment period. The public meeting was held at 7:00 p.m. on September 10, 1998 at the Howell Township Hall, 3525 Byron Road. The public comment period began on August 25, 1998 and ran through September 27, 1998.

In July 1999, MDEQ issued an information bulletin to the public informing them that the decision on the remedy would be postponed until additional investigations concerning the extent of PCB contamination were performed. It also informed the public that U.S. EPA would take over the lead of the investigation and remediation of the Site.

Additional sampling of the Facility began in November 1999 and was completed in April 2000. This sample data was released to the public in the Data Evaluation Report, May 2000. In February 2001, a Supplemental FS was issued to the public based on an evaluation of PCB samples obtained at the Site in late 1999 and early 2000. On July 6, 2001, U.S. EPA issued a revised Proposed Plan. All of these documents, including the analytical data upon which this decision was based, were made available in both the Administrative Record and the information repository. The notice of availability of these documents was published in the Livingston County Daily Press and Livingston County Argus on July 5, 2001.

A public comment period was held from July 9 through August 7, 2001, but was extended to September 6, 2001 at the request of Michigan United Conservation Clubs, Lansing, Michigan. A public meeting was held on July 18, 2001, to present the results of the Supplemental FS and the preferred alternative as presented in the Proposed Plan for the remedial action. All significant comments which were received by U.S. EPA prior to the end of the public comment period, including those expressed verbally at the public meeting, are addressed in the Responsiveness Summary, which is attached to this Record of Decision.

# IV. Scope of Response Action

U.S. EPA has organized this project into a single response action. This response action is to address the PCB contaminated Shiawassee River sediment, floodplain soil, and former CFC facility soil. The final action combines active remediation of sediment and floodplain soils with monitored natural recovery to achieve levels that will be protective of human health and the environment.

The soil and sediment at the Site will be addressed by excavation and dredging of approximately 1,755 cubic yards of the contaminated soil and 1,590 cubic yards of contaminated sediment and off-site disposal.

Monitored natural recovery will be employed post-excavation and dredging to address residual PCB in sediments. A post remediation monitoring program will be implemented to ensure natural recovery of the river was occurring.

# V. Site Characteristics

The primary contaminant at the Site is associated with the past operation of discharging process cooling water contaminated with PCB-containing oils to an unlined lagoon located to the north of

the CFC facility. The lagoon periodically overflowed to an on-site drainage ditch, which led directly to the river.

# A. Groundwater Contamination

MDNR collected groundwater samples from five monitoring wells and one private well on the former CFC facility during January 1988. None of these samples contained detectable concentrations of PCBs.

# **B. Soil and Sediment Contamination**

During the supplemental investigation conducted in 1999, river sediment and floodplain soil samples were collected at previously sampled locations or transects downstream of the CFC facility to delineate PCB "hot spots" and also to refine the estimate of the volume of sediment requiring remediation. Sediment samples were also collected from Shaw Lake and the Shiawasseetown Reservoir to assess whether PCBs had migrated from the CFC facility and the Shiawassee River Site to these areas. Surface and subsurface soil samples were collected at the CFC facility in areas of formerly identified soil contamination.

# **B.1 CFC Facility Results**

Soil samples were collected from the CFC facility property in areas of former soil contamination previously identified at the CFC facility. Ten surface soil samples were collected from the CFC facility at the locations identified in Figure 2. The sampling locations were selected based on results of previous site investigations in areas of previously identified soil contamination. Subsurface soil samples were collected from boreholes advanced at the same locations as the surface soil samples. Three additional subsurface soil samples were collected from the former wastewater pond. These additional samples were collected based on field observations such as soil staining and petroleum odor and also based on field analytical results. PCB contamination was located mainly in the former wastewater ponds located on the east side of the property. The CFC facility soil sample results are presented in Figure 2.

# **B.2 Floodplain Soil and River Sediment Results**

Sampling was conducted to determine the extent of contamination related to the CFC facility that has entered the South Branch of the Shiawassee River. Samples were collected at previously sampled locations or transects downstream of the CFC facility. Floodplain soil and river sediment samples were collected in areas that coincided with the previous 61 transect sampling locations, a distance of approximately 8 miles downstream of the CFC facility, in order to delineate areas of "hot spot" PCB contamination and also to refine the estimate of the volume of sediment that will require remediation. Additional floodplain soil and river sediment samples were collected in areas of "hot spot" contamination. Areas of "hot spot" contamination are areas with initial sample concentrations above 10 mg/kg. "Hot spot" samples were also collected at

Transects 4 and 14 in response to a MDEQ request. Additional floodplain soil and river sediment samples were collected from Transect 62 in a wetland area beyond the 8-mile limit. These samples were also collected in accordance with a MDEQ request. Sediment samples were also collected in Shaw Lake and the Shiawasseetown Reservoir, which are located approximately 18 and 40 miles, respectively, downstream of the CFC facility, to determine if PCBs were present and, if so, at what concentrations. Samples were taken from depths of 0 to 6 feet at both locations. Most of the sample results were non-detect. The highest level detected was 42  $\mu$ g/kg in the reservoir.

Overall, PCB contamination in floodplain soil and river sediment was limited to isolated "hot spots." The "hot spots" were located within 3 miles downstream of the CFC facility. Results for floodplain soil and river sediment samples are presented in Figures 3, 4 and 5, and 6, respectively. Results for sediment samples collected from the Shiawasseetown Reservoir and Shaw Lake are presented in Figures 7 and 8, respectively.

Five locations in the floodplain had PCB contamination over 10 mg/kg. They were Transects 9, 16, 26, 28, and 37. The PCB concentrations were 99, 10, 11, 11, and 13 mg/kg, respectively.

Six locations had PCB contamination over 10 mg/kg in the river sediment. They were Transects 4, 7, 11, 12, 25, and 27. The PCB concentrations were 46, 300, 26, 14, 100, and 13 mg/kg, respectively.

# C. Comparison Between 1988 and 1999 PCB Analytical Results

Comparison between the 1988 and the 1999 PCB analytical results show some important trends in the data: increased PCB concentrations at Transects 7 (non-detect in 1988 vs. 300 mg/kg in 1999 in river sediment (RS)) and 9 (15 mg/kg vs 99 mg/kg in the floodplain (FP)), and significantly reduced PCB levels in Transects 12 through 19, 21, 23 and the remainder of the 8 mile reach. For example, Transect 12 in 1988 had concentration levels of 137, 400, and 147, mg/kg FP and in 1999 had levels of non-detect to 0.71 mg/kg. Similarly, Transects 14 and 16 had PCB levels in 1988 at 32, 767, 102, 63 mg/kg FP, 2 mg/kg RS and 49, 76, 20 mg/kg FP, 1 mg/kg RS respectively; whereas PCB levels in 1999 had increased slightly to 7 mg/kg RS but been reduced to 2, 4, 5 mg/kg FP at Transect 14 and 3, 7, 10 mg/kg FP and non-detect to 0.78 mg/kg RS at Transect 16. See Figures 3 and 5 and Table 1. Analysis of all the historical data of the Site showed that PCB contamination was decreasing steadily in the river.

# D. Contaminant Migration

Based on the comparison of data from 1988 and 1999, the PCBs appear to be dispersing downstream of the CFC facility, without accumulating in any particular location. Sampling in the Shiawasseetown Reservoir and Shaw Lake downstream of the CFC facility, which would act as sediment traps for material moving downstream, showed primarily non-detectable levels of PCBs.

# E. Current and Potential Future Site and Resource Uses

# E.1 Land Uses

Land use along the Shiawassee River is residential, farmland, forest, and light industrial as in the in the case of the CFC facility. The Shiawassee River is located in a largely rural area.

# E.2 Surface Water / Ground-Water Uses

There are no public beaches along the Shiawassee River. Some of the flow in the Shiawassee River is attributable to the City of Howell's wastewaster treatment plant discharge. Fishing is limited at the Site due to the Livingston County Health Department's posted warnings against the human consumption of fish and the lack of significant game fish.

The Shiawassee River is not used as a public water supply. Groundwater is used by local residents for drinking and other uses. Ground-water contamination has not been observed at the Site.

# VI. Summary of Site Risks

# A. Human Health

Risks were assessed based on current land-use conditions for residents living near the Site, for adolescents swimming in the river, and for adolescents trespassing in the wetlands adjacent to the Cast Forge property, or trespassing on the Cast Forge property itself. Based on the concentrations of PCBs available in the environment – primarily in floodplain and river soils and sediments - risk levels greater than 1 x 10<sup>-6</sup> were evident. The risk assessment indicates that nearby residents have the highest potential risks. The majority of the cancer risk for nearby residents is associated with consumption of fish caught in the contaminated reach of the river. Other pathways of concern for this group in order of highest to lowest risk are vegetable consumption, milk consumption, beef consumption, incidental ingestion of floodplain sediment, and dermal contact with floodplain sediment. Non-cancer health risks were also estimated for the same human groups. Based on the findings of the risk assessment, consumption of fish by nearby residents was the only exposure pathway that was estimated to potentially cause adverse non-cancer health effects.

Under future land use conditions, the reasonable maximum exposure scenario was used and it was assumed that residences would be built on the Cast Forge facility without any cleanup. The pathways of potential chemical exposure to residents were considered to be the same as under current land use conditions. The exception is that the concentration in soil on the Cast Forge property was used to assess the level of exposure to soils surrounding the residences. Under these assumptions, the magnitude of cancer and non-cancer health risks in the future is essentially the same as for current land use conditions. As is the situation under current land use

conditions, residents remain the group at greatest risk from contaminant exposure, due primarily to fish consumption.

# A.1 Toxicity Assessment Summary

Cancer potency factors (CPFs) have been developed by EPA's Carcinogenic Assessment Group for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. CPFs, which are expressed in units of (mg/kg-day)<sup>-1</sup>, are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the CPF. Use of this approach makes underestimation of the actual cancer risk highly unlikely. Cancer potency factors are derived from the results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied.

Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting noncarcinogenic effects. RfDs, which are expressed in units of mg/kg-day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals. Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans). These uncertainty factors assure that the RfDs will not underestimate the potential for adverse non carcinogenic effects to occur. Table 2 gives RfDs and slope factors.

Excess lifetime cancer risks are determined by multiplying the intake level with the cancer potency factor. These risks are probabilities that are generally expressed in scientific notation (e.g.,  $1x10^6$  or 1E-6). An excess lifetime cancer risk of  $1x10^6$  indicates that, as a plausible upper bound, an individual has a one in a million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year lifetime under the specific conditions at a site.

Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as the hazard quotient (HQ) (or the ratio of the estimated intake derived from the contaminant concentration in a given medium to the contaminants reference dose). By adding the HQs for all contaminants within a medium or across all media to which a given population may reasonably be exposed, the Hazard Index (HI) can be generated. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single media or across media.

Excess cancer risk estimates were calculated for exposures to carcinogenic indicator chemicals by adding together the product of the chronic daily intakes (CDI) and cancer potency factor for all carcinogenic indicator chemicals and intake routes for a given human receptor. Hazard indices were calculated for exposures to non-carcinogenic indicator chemicals by summing the

ratios of CDIs to acceptable daily intakes (reference doses) for all chemicals and intake routes for a given human receptor.

# B. Risk Summary

# **B.1 Carcinogenic Risk**

The future exposure scenario included a hypothetical individual who constructs a home on the Cast Forge property at some point in the future. This individual would be expected to come into contact with PCBs via their presence in soil, fish, backyard vegetables, beef and milk. The overall excess lifetime cancer risk calculated for this receptor is (4.1x10<sup>-2</sup>). A non-carcinogenic chronic hazard index of 5.0 was estimated for this receptor with PCB contamination from fish providing the majority of the risk.

The current use scenario, modeled an individual who currently lives near the Shiawassee River. This individual is presumed to come into contact with PCBs via their presence in soil, fish, backyard vegetables, beef and milk. The overall excess lifetime cancer risk calculated for this receptor is (4.1x10<sup>-2</sup>). A non-carcinogenic chronic hazard index of 5.2 was estimated for this receptor with PCB contamination from fish providing the majority of the risk.

# **B.2 Ecological Risk Assessment Results**

The ecological risk assessment was based upon the results of sampling of the Shiawassee River fauna (native fish and crayfish) conducted in April and May 1994. For the purpose of this assessment, Sediment Quality Objectives considered to be protective of wildlife and human receptors utilizing the aquatic resources of the river were developed for the PCB contaminated sediments. The range of values calculated for Sediment Guide line Values and Sediment Quality Guideline Values, as well as National Oceanic and Atmospheric Administration Effects levels and the State of Washington Sediment Quality Criteria, range from 0.0009 to .553 mg/kg. Comparison of these values with the sediment PCB data in Table 1 shows that the Shiawassee River sediments have the potential to cause adverse effects in aquatic biota, fish-eating wildlife and humans consuming fish from the river.

The following table presents the Preliminary Remediation Goals (PRG)s for the Shiawassee River Site developed in August 2000. These PRGs are the result of a re-evaluation of the ecological risk assessment performed in 1995:

Table 2. Rev	ised Sediment PRGs Protective of Fish-Eati	ng Wildlife	· · · · · · · · · · · · · · · · · · ·
		PCB Sedimen	it PRG (mg kg)
Receptor	Dietary Composition	NOAEL-based LOAEL-ba	
Mink	White sucker	0.002	0.1
	White sucker and Crayfish	0.004	0.2
	White sucker, Crayfish, and Rock bass	0.003	0.1 - 0.2
Kingfisher	White sucker	0.01	0.1
	White sucker and Crayfish	0.02	0.2
•	White sucker, Crayfish, and Rock bass	0.01 - 0.02	0.1 - 0.2

The ecological risk assessment identifies a range of .003 mg/kg to 0.2 mg/kg as being protective of ecological receptors.

# C. Assessment of Human Health and Environmental Risks Presented by the Site

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response actions selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or, the environment.

# VII. Remediation Objectives

The remedial action objective is to protect human health and the environment from imminent and substantial endangerment due to PCBs attributed to the Site. To achieve this remediation objective, PCB-contaminated sediment will be remediated so that the five mile reach beginning at M-59 of the river will reach an average PCB sediment concentration of approximately 1 mg/kg immediately after active remediation and utilize monitored natural recovery over time to achieve the long-term PRGs. The long-term PCB PRG range for the Shiawassee River sediment, 0.003 to 0.2, is based on protecting mink through dietary consumption of fish.

A long-term monitoring plan will be developed during remedial design to ensure that natural recovery is adequate to meet the long-term cleanup range in a reasonable timeframe and that these levels remain protective of mink or other appropriate ecological receptors. In addition, attaining the levels which are protective of ecological receptors will eliminate the need for fish consumption advisories for recreational fishing. The historical trend of all the data based on previous sampling events shows the PCB contamination to be decreasing steadily, and therefore, natural recovery is an appropriate component of the remedy.

# VIII. Description of Alternatives

In developing the PRGs for the Shiawassee River Site, U.S. EPA used a Surface Weighted Average Concentration (SWAC) method, which determines the average concentration of a contaminant for a particular reach. The table below has two different SWAC evaluations for the Shiawassee River. The top table is the SWAC that would be achieved post-remediation for the particular reach listed if that reach is remediated to the PRG listed above it. The bottom portion of the table is the SWAC that would be achieved post-remediation for the first five miles if the section of the reach is remediated to the PRG listed above it. The term "1 mg/kg replacement" means that after the PCB contamination is remediated, the resultant concentration will be 1 mg/kg or less.

SHIAWASSEE RIVER PROJECTED AVERAGE PCB CONCENTRATION IN SEDIMENT

		PRG (	mg/kg)		Average PCB Concentration
Reach (miles)	25	10	5	1	Based on 1999 Sampling
	Projected Ave	erage Sediment	PCB Concentr	ation with 1 m	g/kg Replacement for
0 - 1	2.7	2.3	1.5	0.8	3.0
1 - 2	0.9	0.9	0.8	0.6	1.0
2 - 3	n/c	n/c	n/c	0.6	0.6
3 - 4	n/c	n/c	n/c	0.7	0.8
4 - 5	n/c	n/c	1.3	0.9	1.5
Reach (Miles)	Projected Ave Specified Rea	~	PCB Concentr	ation with 1 mg	g/kg Replacement for
0 - 1	2.7	1.28	1.06	0.97	3.0
0 - 2	1.9	1.25	1.02	0.85	2.9
. 0 - 3	1.56	1.25	1.02	0.81	1.6
0 - 4	1.29	1.25	1.02	0.79	1.5
0 - 5	1.29	1.25	0.99	0.70	1.4

n/c: No cleanup necessary to meet criteria.

All cleanup alternatives include a process called monitored natural recovery. Monitored natural recovery will ultimately be the remedy component that achieves levels protective of human health and the environment in sediments. Natural recovery means the slow decrease in PCB levels in sediments as the PCBs are covered with cleaner sediments, break down, or are otherwise dispersed in the river. Overtime, PCB levels will continue to decrease even with Alternative 1, No Action.

# A. Remedial Alternative 1 - No Action

Alternative 1 consists of no action. Under Alternative 1, no remedial action would be taken. PCB-contaminated soil and sediment would be left in place at the CFC facility and in the Shiawassee River and floodplain "as is" without implementation of institutional controls, containment, removal, treatment, or other mitigating actions. The effectiveness of the no action alternative would depend on contaminant and medium characteristics that affect the degradation of PCBs as well as processes that could transport PCB-contaminated material downstream.

The no action alternative (1) is nonintrusive, thereby allowing continued use of the Site; (2) has little to no potential for releasing contaminants during remediation; and (3) is not affected by Site access or equipment limitations. No action does not involve the installation of any equipment. Monitoring would be required to evaluate its effectiveness. No capital costs are associated with the no action alternative, and the cost of monitoring is low. The cost for Alternative 1 is approximately \$6,000.

The time frame to achieve the PRGs of 0.003 mg/kg to 0.2 mg/kg PCBs are estimated at 18 to 20 and 9 to 11 years, respectively. This is based on the trend of historic PCB analytical data and comparing this trend with existing (1999) SWAC numbers. This method of estimating the time to achieve the PRGs has not been calibrated and is more accurate for a homogenous data set. For example, where no contaminant levels exceed 25 mg/kg as a result of remediation to that level, as compared to no remediation where one hotspot is as high as 300 mg/kg in the river and other hotspot concentrations vary.

The following alternatives all include post remediation monitoring and institutional controls for the site and the river.

# B. Remedial Alternative 2 - Engineered Caps with Deed and River-Use Restrictions

Alternative 2 involves placing caps over contaminated soil and sediment at the Shiawassee River Site. A clay and soil cap would be placed over the contaminated floodplain soil area. The cap would prevent (1) mobilization of PCBs and their downstream migration; and (2) direct contact of potential receptors with contaminated soil. Based on data collected during the RI, 2,945 square meters (m²) of contaminated soil would need to be capped in order to meet the PCB PRG of 10 mg/kg, and 537 m² of contaminated soil would need to be capped in order to meet the PCB PRG of 25 mg/kg. The cap would consist of 6 inches of clay fill material topped with 6 to 12

inches of topsoil. The capped areas would be revegetated to prevent cap erosion. Deed restrictions would be necessary after cap construction to maintain the integrity of the cap by prohibiting intrusive activities in the capped areas.

Alternative 2 also involves placing a cap over contaminated river sediment. A material such as AquaBlok<sup>TM</sup> would be placed over contaminated areas to prevent (1) downstream sediment mobilization and migration; and (2) direct contact of potential receptors with contaminated sediment. The AquaBlok<sup>TM</sup> material consists of pellets with a gravel interior surrounded by clay material. Sediment barriers such as silt fences would first be placed around the area of contaminated sediment. The AquaBlok<sup>TM</sup> material would then be placed in the river bed over contaminated material. The water hydrates clay surrounding the pellets, causing the clay to expand and form an impermeable barrier. The sediment cap would consist of 6 inches of the capping material. An estimated 1,539 m<sup>2</sup> of river sediment would need to be capped in order to meet the PCB PRG of 10 mg/kg, and 690 m<sup>2</sup> of river sediment would need to be capped in order to meet the PCB PRG of 25 mg/kg.

Capping sediment with PRGs of 5 and 1 mg/kg was determined not to be practical since this would entail raising the streambed substantially over long reaches and cause flooding or streambed stability problems.

The capital cost of Alternative 2 is low to moderate and the operation and maintenance (O&M) costs are low. The cost for Alternative 2 is approximately \$215,600 based on the 10 mg/kg PRG, and \$157,500 based on the 25 mg/kg PRG.

# C. Remedial Alternative 3 - Excavation of Contaminated Soil and Sediment and Off-Site Disposal in Landfills

Alternative 3 involves excavating PCB-contaminated soil at the CFC facility and on the river floodplain and contaminated sediment in the Shiawassee River. An estimated 795 yd³ of contaminated soil would be excavated from the CFC facility to meet the PCB PRG of 10 mg/kg. No CFC facility soil would require removal to meet the PCB PRG of 25 mg/kg. In addition, 1,755 yd³ of contaminated soil would be excavated from the floodplain to meet the 10 mg/kg PRG and 561 yd³ of contaminated soil would be excavated from the floodplain to meet the 25 mg/kg PRG.

Alternative 3 also consists of dredging PCB-contaminated sediment from the riverbed. An estimated 11,975 yd³ would be removed to meet the 1 mg/kg PRG and 1,590 yd³ would be removed to meet the 5 mg/kg PRG. An estimated 613 yd³ of contaminated sediment would be removed to meet the 10 mg/kg PRG, and 275 yd³ would be removed to meet the 25 mg/kg PRG.

Excavated soil and sediment containing PCBs at concentrations of 50 mg/kg or greater would be disposed of at an off-site TSCA landfill facility, and soil and sediment containing PCBs at concentrations of less than 50 mg/kg would be disposed of at an off-site sanitary landfill facility.

The cost for Alternative 3 is approximately \$408.100 based on the 10 mg/kg PRG (3c) and \$115.200 based on the 25 mg kg PRG (3d) for floodplain soil and sediment. The cost of remediating the floodplain to 10 mg/kg PRG and the sediment to 5 mg/kg PRG (3b) and 1 mg/kg PRG (3a) is \$517.000 and \$1,677.000, respectively.

The estimated timeframes to achieve the PRGs of 0.003 mg/kg to 0.2 mg/kg PCBs for the following cleanup goals in the river are:

a.	1 mg/kg	15 to 17	and 5 to 6	s years, respectively;
b.	5 mg/kg	18	and 7	years, respectively;
c.	10 mg/kg	19	and 9	years, respectively;
d.	25 mg/kg	20	and 10	years, respectively.

Remedial Alternative 4 - Excavation of Contaminated Soil and Sediment and On-Site Disposal in Landfill

Alternative 4 is similar to Alternative 3; however, excavated soil and sediment would be placed in an on-site TSCA cell constructed on the CFC facility property.

Alternative 4 also consists of dredging PCB-contaminated sediment from the riverbed. The volumes for the PRGs are the same as above for Alternative 3.

Excavated contaminated soil and sediment would be transported to the CFC facility property and placed in the TSCA cell. Groundwater monitoring would be conducted as required under TSCA regulations to ensure that PCBs are not released to groundwater at the Site.

The cost for Alternative 4 is approximately \$591,000 based on the 10 mg/kg PRG (4c) and \$272,200 based on the 25 mg/kg PRG (4d). The cost of remediating the floodplain to 10 mg/kg PRG and the sediment to 5 mg/kg PRG (4b) and 1 mg/kg PRG (4a) is \$594,000 and \$842,000, respectively.

# IX. Comparative Analysis of Alternatives

In order to determine the most appropriate alternative for the Shiawassee Site, the alternatives were evaluated against each other. Comparisons were based on the nine evaluation criteria. The nine criteria are: 1) overall protection of human health and the environment, 2) compliance with applicable or relevant and appropriate requirements (ARARs), 3) long-term effectiveness and permanence, 4) reduction of toxicity, mobility, and volume, through treatment, 5) short-term effectiveness, 6) implementability, 7) cost, 8) state acceptance, and 9) community acceptance.

# A. Overall Protection of Human Health and the Environment

All of the remedial alternatives considered for the Shiawassee Site are protective of human health and the environment by eliminating, reducing, or controlling risks at the Shiawassee Site, except for the No Action Alternative, which lacks institutional controls. Since Alternative 1 is not protective, it will not be evaluated further in this ROD.

Alternative 2 would eliminate exposure to contaminants in soil and sediment at the Shiawassee Site through capping. Thus, the potential for direct contact with and ingestion of contaminated soil and sediment from the Site would be minimized. Contaminated sediment would also be isolated from potential ecological receptors such as fish. Furthermore, the potential for migration of contaminated sediment would be reduced because capping would reduce the exposure of contaminated sediment to running water and subsequent erosion. The potential for migration of contaminated soil would be reduced because capping would reduce the exposure of contaminated soil to rainfall and runoff. The overall protectiveness of Alternative 2 depends on maintaining the integrity of the caps and the ability to retain deed restrictions that would prohibit the removal of the caps and excavation of soil from beneath the capped areas at some point in the future.

Alternatives 3 and 4 would protect human health and the environment because they involve removing contaminated soil and sediment from the Site, thereby eliminating the potential for direct contact with, ingestion of, or inhalation of contaminated soil and sediment. The overall protectiveness of Alternative 3 depends on the effective use of deed restrictions and natural recovery of the river. Alternative 4 is less protective on-site since it depends on the protectiveness of the on-site landfill, in addition to the effective use of deed restrictions and the natural recovery of the river.

# B. Compliance With ARARs

Each alternative is evaluated for compliance with ARARS, including chemical-specific, action-specific, and location-specific ARARS. Alternatives 2, 3, and 4 would comply with identified federal and state ARARs.

# C. Long-Term Effectiveness and Permanence

This evaluation focuses on the results of a remedial action in terms of the risks remaining at the Site after response objectives have been met. The following factors are addressed for each alternative: magnitude of remaining risk, adequacy and reliability of controls.

Alternative 2 would minimize long-term exposure by covering contaminated soil and sediment with a cap and through application of deed restrictions. Alternatives 3 and 4 would provide greater long term effectiveness, and permanence at the Site by removing the PCBs from the river and floodplain and would accelerate the removal of fish consumption advisories.

# D. Reduction of Toxicity, Mobility, or Volume (TMV) Through Treatment

This evaluation addresses the statutory preference for selecting remedial actions that employ treatment technologies which permanently and significantly reduce toxicity, mobility, or volume of the hazardous substances. This preference is satisfied when treatment is used to reduce the principal threats at a Site through destruction of toxic contaminants, irreversible reduction of contaminant mobility, or reduction of total volume of contaminated media.

The PCB contaminated material at the site is considered a low level threat and preference for treatment does not apply to low level threats.

### E. Short-Term Effectiveness

This evaluation focuses on the effects to human health and the environment which may occur while the alternative is being implemented and until the remedial objectives are met. The following factors were used to evaluate the short term effectiveness of each alternative: protection of the community during remedial actions, protection of workers during remedial actions, environmental impacts from implementation of alternatives, and time until remedial objectives are met.

Alternatives 2, 3 and 4 would create short-term impacts comparable to one another, including the release of dust and air pollutants during capping/excavation of contaminated soils and sediment, increased noise levels, and increased traffic around the Site. Use of engineering controls would limit air emissions and sediment migrating downstream. Alternative 3 would require offsite disposal and create more potential for release of contaminants during transportation because soils and sediment will be transported to an off-site disposal facility. However, engineering and transportation controls will ensure that these impacts are minimized.

# F. Implementablity

This evaluation addresses the technical and administrative feasibility of implementing the alternatives and the availability of the various services and materials required during its implementation.

Technical and administrative requirements for implementing Alternatives 2, 3, and 4 would be moderate. Alternative 2 through 3 would each have to comply with administrative requirements regarding transport of hazardous waste, as set by the U.S. Department of Transportation.

# G. Cost

This evaluation examines the estimated costs for implementing the remedial alternatives. Capital and O&M cost are used to calculate estimated present worth costs for each alternative. All four alternatives have very low or no O&M costs and therefore, will not be discussed. The discount

rate used to calculate the present worth value for the alternatives is 7% over thirty years. The following Table presents the total present worth costs for the four alternatives:

Evaluation Criteria	Alternative 1 No Action	Alternative 2 Capping	Alternative 3 Excavation and Off-Site Disposal	Alternative 4 Excavation and On-Site Disposal
7. Total Cost – a 1 mg/kg b 5 mg/kg c 10 mg/kg d 25 mg/kg	\$6,000 \$6,000 \$6,000 \$6,000	\$215,600 \$157,500	\$1,677,000 \$517,000 \$408,300 \$115,000	\$842,000 \$594,000 \$591,000 \$272,000

The next least costly alternative is Capping, which prevents exposure of the contaminated material from the environment, but removes none of the contaminated material from the environment. Alternatives 3 and 4 are similar in that the contamination is eliminated from the environment, and Alternatives 3b, c, and d are less costly than Alternatives 4 b, c, and d. The cost of constructing an on-site landfill makes it less expensive for disposal than off-site disposal only at the higher volume of material anticipated for the 1 mg/kg PRG.

# H. State Acceptance

Consistent with the NCP, U.S. EPA provided the State of Michigan with an opportunity to concur with this Record of Decision. The State of Michigan has not yet taken a formal position regarding the remedy set forth in this ROD.

# I. Community Acceptance

Community response to the alternatives is presented in the responsiveness summary, which addresses comments received during the public comment period.

# J. Principle Threat Wastes

Principal threat wastes no longer exist at this site due to prior remediation or through natural processes. The wastes remaining on the site should be considered low level threat material.

# X. The Selected Remedy

After considering the requirements of CERCLA, the detailed analysis of alternatives, and public comments, EPA has selected Alternative 3b for the final actions at the Shiawassee River Site.

Alternative 3b involves excavating PCB-contaminated soil at the CFC facility and excavating and/or dredging contaminated sediment and river floodplain soils along the Shiawassee River. An estimated 795 yd³ of contaminated soil would be excavated from the CFC facility to meet the PRG of 10 mg/kg. The river sediment would be remediated to 5 mg/kg PRG for the first mile only, requiring excavation of approximately 1600 cubic yards. In addition, one hotspot located in the second mile at Transect 25 (Figure 5) where PCBs were found at 100 mg/kg in 1999, will also be remediated to 5 mg/kg. Remediating the floodplain soil to meet the 10 mg/kg PRG would require excavation of approximately 561 yd³ of contaminated soil. Excavated soil and sediment containing PCBs at concentrations of 50 mg/kg or greater would be disposed of at an off-site TSCA landfill facility, and soil and sediment containing PCB at concentrations of less than 50 mg/kg would be disposed of at an off-site sanitary landfill facility. The total capital cost for this alternative is \$517,000. Institutional controls along with deed restrictions will be required for the CFC facility. Post remediation monitoring will be required to ensure that natural recovery of the river is occurring.

U.S. EPA identified a SWAC range of .003 to 0.2 mg/kg as being protective of human health and the environment. Remediating the first river mile to 5 mg/kg PRG reduces the overall SWAC from 3.0 to 1.06 mg/kg immediately after completion of excavation and/ or dredging. U.S. EPA is relying on monitored natural recovery to reduce the SWAC to within the range of 0.003 to 0.2 mg/kg after active remediation of the sediments to 5 mg/kg PRG for the first river mile.

U.S. EPA does not believe that removing sediments beyond those identified in this remedy will result in additional risk reduction immediately after completion of excavation and/or dredging. The reductions in SWAC immediately after completion of excavation and/ or dredging using a 5 mg/kg PRG for the first five miles would lower the SWAC from 1.06 to 0.99 mg/kg, or if a 1 mg/kg PRG were used the SWAC immediately after completing excavation and or dredging to a range of 0.7 to 0.97 mg/kg. However, remediation costs would increase significantly if additional sediments were removed. In addition, cleanup in the additional river miles would require greater disturbance of the river and floodplain such as the need for access for construction equipment.

# XI. Statutory Determinations

The selected remedy must satisfy the requirements of Section 121(a-e) of CERCLA to:

- A. Protect human health and the environment;
- B. Comply with ARARs;
- C. Be cost-effective;
- D. Utilize permanent solutions and alternate treatment technologies to the maximum extent practicable; and,
- E. Satisfy a preference for treatment as a principle element of the remedy.

The implementation of Alternative 3b at the Shiawassee River Site satisfies the requirements of CERCLA as detailed below:

## A. Protection of Human Health and the Environment

The implementation of the selected alternative will reduce and control potential risks to human health and the environment posed by exposure to PCBs, a hazardous substance and carcinogen.

The excavation and off-site disposal of PCB contaminated material, in combination with institutional controls, will reduce the potential risk caused by exposure of PCBs to local residents and others, such as fishermen. These actions will effectively reduce the PCB exposure pathways of ingestion, inhalation, and dermal contact. These actions will also result in the reduction of risk to wildlife from exposure to PCBs by removing a large mass of PCBs from the environment. PCB-contaminated sediment will be remediated so that the five mile reach beginning at M-59 of the river will reach an average PCB sediment concentration of approximately 1 mg/kg immediately after active remediation and utilize monitored natural recovery over time to achieve the PRG range of 0.003 to 0.2 mg/kg, based on protecting mink through dietary consumption of fish.

A long-term monitoring plan will be developed during remedial design to ensure that natural recovery is adequate to meet the long-term cleanup range in a reasonable timeframe and that these levels remain protective of mink or other appropriate ecological receptors. In addition, we believe that attaining the levels which are protective of ecological receptors will eliminate the need for fish consumption advisories for recreational fishing. The historical trend of all the data based on previous sampling events shows the PCB contamination to be decreasing steadily, and therefore, natural recovery is an appropriate component of the remedy.

No unacceptable short-term risks or cross-media impacts will be caused by implementation of the remedy. The community and site workers may be exposed to nuisance noise and non-PCB dust during the period of excavation. Appropriate measures will be taken during excavation and construction activities to minimize the noise and dust impacts of the remedial action on the surrounding community.

# **B.** Compliance With ARARs

The final remedy selected, Alternative 3b, will comply with ARARs that are pertinent to the scope of the action. The ARARs for the final response action are listed below.

# **B.1 Chemical-specific ARARS**

Chemical-specific ARARs regulate the release to the environment of specific substances having certain chemical characteristics. Chemical-specific ARARs typically determine the extent of cleanup at a site.

# **B.1.a** Soils

Michigan Act, Part 201, industrial soil standards are an ARAR for the CFC facility soils. Alternative 3b complies with Part 201 requirements. The TSCA PCB Mega-rule, 40 CFR Parts 750 and 761, is an ARAR for CFC facility and floodplain soils. 40 CFR 761.61 provides cleanup and disposal options for PCB remediation waste, and 40 CFR 761.61(c) authorizes EPA to approve risk-based cleanups for these wastes at Superfund sites. The U.S. EPA Superfund Division Director, in consultation with the TSCA program, under which disposal is to occur, can make a determination that a proposed disposal method will not pose an unreasonable risk of injury to health or the environment. This ROD serves as the determination that the selected remedy will not pose an unreasonable risk of injury to health or the environment. As a result, Alternative 3b complies with TSCA provisions.

# **B.1.b Sediment**

The TSCA PCB Mega-rule, 40 CFR Parts 750 and 761, is also an ARAR for sediments. There are no state ARARs for sediments. Alternative 3b complies with TSCA provisions for sediments as discussed above regarding soils.

# **B.1.b Surface Water**

# i. State ARARs

Section 303 of the CWA requires the State to promulgate state water quality standards for surface water bodies, based on the designated uses of the surface water bodies. CERCLA remedial actions involving surface water bodies must ensure that applicable or relevant and appropriate state water quality standards are met. The standards established pursuant to R323.2102-.2189 of the Michigan Water Resources Commission Act, Public Act 245 of 1929, as amended, would be applicable to this Site. The Shiawassee River Site is designated as a cold water fishery.

# **B.2 Location-specific ARARs**

Location-specific ARARs are those requirements that may apply if a site is located in a special location or contains unique features like wetlands.

# i. Federal ARARs

Executive Order 11990 - Protection of Wetlands is an applicable requirement to protect against the loss or degradation of wetlands. Alternative 3b will be designed to restore any wetlands damaged as part of the remediation.

# ii. State ARARs

The Goemaere-Anderson Wetland Protection Act of 1979 (Act 203), now NREPA Part 303, Wetlands Protection (1994; PA 451) regulates any activity which may take place in wetlands in the State of Michigan. As discussed above, Alternative 3b will be designed to restore any wetlands damaged as part of the remediation.

# **B.3 Action-specific ARARs**

Action-specific ARARs are requirements that define acceptable treatment and disposal procedures for hazardous substances.

# i. Federal ARARs

TSCA is applicable. Excavated soil and sediment containing PCBs at concentrations of 50 mg/kg or greater would be disposed of at an off-site TSCA landfill facility, and soil and sediment containing PCB at concentrations of less than 50 mg/kg would be disposed of at an off-site sanitary landfill facility.

## C. Cost-effectiveness

EPA believes the selected remedy is cost-effective in protecting human health and the environment from the contaminated soil and sediment at the Site. Cost-effectiveness compares the effectiveness of an alternative in proportion to its cost of providing its environmental benefits. Alternative 3b is the most cost-effective of the alternatives that meets the objective of the remedial action. Furthermore, the reason that river sediment would be remediated to 5 mg/kg PRG for the first mile is based on SWAC evaluation. U.S. EPA identified a SWAC range of .003 to 0.2 mg/kg as being protective of human health and the environment. Remediating the first river mile to 5 mg/kg PRG reduces the overall SWAC from 3.0 to 1.06 mg/kg. The reductions in SWAC from applying the 5 mg/kg PRG for the for the first five miles would lower the SWAC from 1.06 to 0.99 mg/kg or from applying a 1 mg/kg PRG to the river, which would lower the SWAC to a range of 0.7 to 0.97 mg/kg, would significantly raise remediation cost while only marginally lowering the SWAC. U.S. EPA is relying on monitored natural recovery to reduce the SWAC further after remediation of the sediments to 5 mg/kg PRG for the first river mile. Alternative 3b provides overall effectiveness proportional to its cost and represents a reasonable value.

# D. Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

EPA believes the selected remedy for the Shiawassee River Site represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective

manner for the final action. The Alternative represents the best balance of tradeoffs among the alternatives with respect to the pertinent criteria given the limited scope of the action

# E. Preference for Treatment as a Principal Element

The PCB contaminated material at the site is considered a low level threat and preference for treatment does not apply to low level threats. The PCB contaminated material is expected to be contained at an off-site landfill.

# XII. Documentation of Significant Changes

The preferred alternative in the proposed plan was to remediate sediment to 5 mg/kg PRG for the first mile only. After consideration of comments received from the MDEQ and consultation with the U.S. EPA TSCA program, U.S. EPA has chosen to remediate one additional hotspot in the second mile located at Transect 25.

(ug PCB/kg-dry)	(ug PCB/kg-dry
SD00   1.0'   34+   58*/ND   SD00E   0.5'/2.5'   ND/ND   SD01W   0.5'/2.5'   211.3*/ND   SD01C   0.5'/2.5'   ND/ND   SD01E   0.5'/2.5'   ND/ND   SD01E   0.5'/2.5'   ND/ND   SD03C   ND/ND   ND/ND   SD03C   ND/ND   SD03C   ND/ND   SD03C   ND/ND   ND/ND	SD05W         0.5'/2.5'         ND/ND           SD05W1         0.5'/2.5'         19/27           SD05W2         0.5'/2.5'         ND/ND           SD05W3         0.5'         ND           SD05C         0.5'/2.5'         7,380/ND           SD05         1.0         ND           SD05E1         0.5'/2.5'         2,100/ND           SD05E1         0.5'/2.5'         2,100/ND           SD05E1         0.5'/2.5'         2,100/ND           SD05E         0.5'/2.5'         570/ND

\* AROCLOR 1260

TABLE 1
1988 PCB Sampling Results

SECTION	SAMPLE I.D.	DEPTH	CONCENTRATION (ug PCB/kg-dry)	SECTION	SAMPLE I.D.	DEPTH	CONCENTRATION (ug PCB/kg-dry)
09	SDO9W	0.5'/2.5'	7,260/302	14	SD14W	0.5'/2.5'	2,560/ND
	SD09	1.0	6,941		SD14W1	0.5'/2.5'/4.5'	370/ND/330
	SD09C	0.5'/2.5'	15,800/8,250		SD14W2	0.5'/2.5'	ND/ND
	SD09E	0.5'/2.5'	6,650/26		SD14W3	0.5'	27
10	SD10W3	0.5'	12		SD14	1.0	2,213
	. SD10W2	0.5'/2.5'	13/ND		SD14E1	0.5'/2.5'	10,200/63,000
	SD10W1	0.5'/2.5'/4.0'	370/21/17		SD14C	0.5'/2.5'	32,300/767,000
	SD10E1	0.5'/2.5'/5.0'/6.0'	630/260/630/1,300		SD14E	0.5'/2.5'	2,670/662
	SD10E2	0.5'/2.5'	ND/ND	}	SD14E2	0.5'/2.5'	790/170
12	SD12W2	0.5'/2.5'	75/170	15	SD15W2	0.5'/2.5'	85/ND
	SD1.2W	0.5'/2.5'	163/ND	ŀ	SD15W1	0.5'/2.5'/3.5'	20,000/110/590
	SD12C	0.5'/2.5'	137,400/400,000		SD15E1	0.5'/2.5'	49,000/76,000
	SD12W1	0.5'/2.5'	147,000/15,000		SD15E2	0.5'/2.5'	48/12
	SD12	1.0	R		SD15E3	0.5′	25
·	SD12E1	0.5'/2.5'/4.0'	1,200/320/520	16	SD16W2	0.5'/2.5'	ND/ND
	SD12E	0.5'/2.5'	17,430/R	1	SD16W	0.5'/2.5'	28,600/332,000
	SD12E2	0.5'/2.5'	ND/ND		SD16W1	0.5'/2.5'	11,200/720
13	SD13W3	0.5'	ND	]	SD16E1	0.5'/2.5'/3.5'	1,580/48/130
	SD13W2	0.5'/2.5'	33/22	Ì	SD16C	0.5'/2.5'	355/ND
	SD13W1	0.5'/2.5'	32,000/55,500	İ	SD16E	0.5'/2.5'	ND/ND
	SD13E1	0.5'/2.5'/4.0'	13,000/3,200/200	1	SD16	1.0	986
	SD13E2	0.5'/2.5'	110/14		SD16E2	0.5'/2.5'	41/ND
	05.022	0.0 / 2.0	,	1	SD16E2	0.5'/2.5'	, ,
				Í	SD16E3	0.572.5	41/ND
}				18	SD18W		ND ·
				10	SD18W	0.5'/2.5'	1,510/ND
				1		1.0	4,054
1				1	SD18C	0.5'/2.5'	50,100/13,600
			<u> </u>	<u> </u>	SD18E	0.5'/2.5'	ND/ND

SECTION	SAMPLE I.D.	DEPTH	(ug PCB/kg-dry)	SECTION	SAMPLE I.D.	DEPTH	CONCENTRATION (ug PCB/kg-dry)
19	SD19W3 SD19W2 SD19W1 SD19E1 SD19E2 SD21W1 SD21W2 SD21E1 SD21C SD21E2 SD21E2 SD21E SD21E3	0.5' /2.5' 0.5' /2.5' 0.5' /2.5' 0.5' /2.5' 0.5' /2.5' 0.5' /2.5' 1.0' 0.5' /2.5' 0.5' br>0.5' /2.5' 0.5'	ND 24/76 45/280/57 25,000/12,0000 48/ND 191/ND 255/350/90 ND/5.3 6,500 30,000/20,000 13,500/1,700 ND/36/6.8 ND/ND ND	23 25 27	SD23W SD23W2 SD23U SD23U SD23E1 SD23E2 SD23E2 SD23E3 SD25W2 SD25W2 SD25W SD25W SD25E1 SD25E1 SD25E2 SD25E2 SD25E2 SD25E3 SD27W SD27 SD27C SD27E	0.5'/2.5' 0.5'/2.5' 0.5'/2.5' 1.0' 0.5'/2.5' 0.5'/2.5' 0.5'/2.5' 0.5'/2.5' 0.5'/2.5' 0.5'/2.5' 0.5'/2.5' 0.5'/2.5' 0.5'/2.5' 0.5'/2.5' 0.5'/2.5' 0.5'/2.5' 0.5'/2.5' 0.5'/2.5' 0.5'/2.5' 0.5'/2.5' 0.5'/2.5'	ND/ND 47/ND 200/355 5,520/27,570 R 180/ND/ND 660/110 48/25 ND ND/ND 42/ND/ND 5,830/6,246 671 994*/ND/137 3,490/15,000 3,550/562 650/63 ND 6,725/5,710 R 11,37( 749 8,210, 30

र 1254

SECTION	SAMPLE I.D.	DEPTH	CONCENTRATION (ug PCB/kg-dry)
32	SD30W SD30C SD30 SD30E SD32W SD32C SD32 SD32E	0.5'/2.5' 0.5'/2.5' 0.5'/2.5' 0.5'/2.5' 0.5'/2.5' 1.0' 0.5'/2.5'	100/ND 7,100/5,390 682 201/ND 1,100/ND 282/65.9 919 2,490/147
SECTION	SAMPLE I.D.	DEPTH	CONCENTRATION (ug PCB/kg-dry)
34 38	SD34W SD34 SD34C SD34E SD38W SD38C SD38 SD38E	0.5'/2.5' 1.0' 0.5'/2.5' 0.5'/2.5' 0.5'/2.5' 0.5'/2.5' 1.0' 0.5'/2.5'	4,750/205 1,197 12,385/2,730 56.5/ND 188/ND 4,920/935 1,137 23.7/ND
SECTION	SAMPLE I.D.	DEPTH	CONCENTRATION (ug PCB/kg-dry)
40	SD40W SD40 SD40C SD40E	0.5'/2.5' 1.0' 0.5'/2.5' 0.5'/2.5'	ND/ND 457 6,080/5,710 544/ND
42	SD42W SD42C SD42 SD42 SD42E	0.5'/2.5' 0.5'/2.5' 1.0' 0.5'/2.5'	ND/ND 140/ND 6,700 ND/ND
43	SD43W SD43 SD43C SD43E	0.5'/2.5' 1.0' 0.5'/2.5' 0.5'/2.5'	51/ND 4,384 2,070/337 520/37.5

SOURCE: WARZYN, 1992

TABLE 1 cont.

SE	CTION	SAMPLE I.D.	DEPTH	CONCENTRATION (ug PCB/kg-dry)
	<b>45</b>	SD45W SD45C SD45 SD45E SD47W SD47C SD47 SD47E	0.5'/2.5' 0.5'/2.5' 1.0' 0.5'/2.5' 0.5'/2.5' 0.5'/2.5' 1.0' 0.5'/2.5'	775/ND 390/ND 4,220 835/ND 316/R 478/R ND 3,918/324
s	ECTION	SAMPLE I.D.	DEPTH	CONCENTRATION (ug PCB/kg-dry)
	48	SD48W SD48 SD48C SD48E SD49W SD49C SD49 SD49E	0.5'/2.5' 1.0' 0.5'/2.5' 0.5'/2.5' 0.5'/2.5' 1.0' 0.5'/2.5'	9,952/772 3,395 16,129/3,743 2,774/254 41,30/473 1,220/ND 5,009 636/R
۶	SECTION	SAMPLE I.D.	DEPTH	CONCENTRATION (ug FCB/kg-ary)
	50	SD50W SD50C SD50	0.5'/2.5' 0.5'/2.5' 1.0'	98/ND R/R 1,633 364/48
	51	SD50E SD51W SD51 SD51C SD51E	0.5'/2.5' 0.5'/2.5' 1.0' 0.5'/2.5' 0.5'/2.5'	4,880/R 1,412 6,575/98 74/R
	52	SD52W SD52C SD52 SD52E	0.5'/2.5' 0.5'/2.5' 1.0' 0.5'/2.5'	358/ND 13,700/1,746 ND 1,280/103

TABLE 1 cont.

			<u> </u>
SECTION	SAMPLE I.D.	DEPTH	CONCENTRATION (ug PCB/kg-dry)
54	SD53W SD53C SD53C SD53E SD54W SD54 SD54C SD54E	0.5'/2.5' 1.0' 0.5'/2.5' 0.5'/2.5' 0.5'/2.5' 1.0' 0.5'/2.5' 0.5'/2.5'	37/ND 1,/10 15,400/400 ND/ND 1,890/669 ND 1,130/89.3 ND/ND
SECTION	SAMPLE I.D.	DEPTH	CONCENTRATION (ug PCB/kg-dry)
55	SD55W SD55C SD55 SD55E	0.5'/2.5' 0.5'/2.5' 1.0' 0.5'/2.5'	5,640/138 17,650/14,505 ND 10,590/270
SECTION	SAMPLE I.D.	DEPTH	CONCENTRATION (ug PCB/kg-dry)
56	SD56W SD56 SD56C SD56E	0.5'/2.5' 1.0' 0.5'/2.5' 0.5'/2.5'	5,140/ND ND 186/ND ND/ND

TABLE 1 cont.

SECTION	SAMPLE I.D.	DEPTH	CUNCENTRATION (ug PCB/kg-dry)
53 	SD58W SD58 SD58C SD58E SD59W SD59 SD59C SD59E	0.5'/2.5' 1.0' 0.5'/2.5' 0.5'/2.5' 0.5'/2.5' 1.0' 0.5'/2.5' 0.5'/2.5'	107/130 369 275/187 240/ND 522/50.4 ND 6,490/ND 1,480/41.1
SECTION	SAMPLE I.D.	DEPTH	CONCENTRATION (ug PCB/kg-dry)
60 - 61	SD60W SD60C SD60 SD60E SD61W SD61C SD61 SD61E	0.5'/2.5' 0.5'/2.5' 0.5'/2.5' 0.5'/2.5' 0.5'/2.5' 1.0' 0.5'/2.5'	92.9/ND* 121/118* ND/ND 820/27.6 230/ND 730/ND 7,200 320/ND

+ AROCLOR 1254

TABLE 1 cont.

# MALCOLM PIRNIE

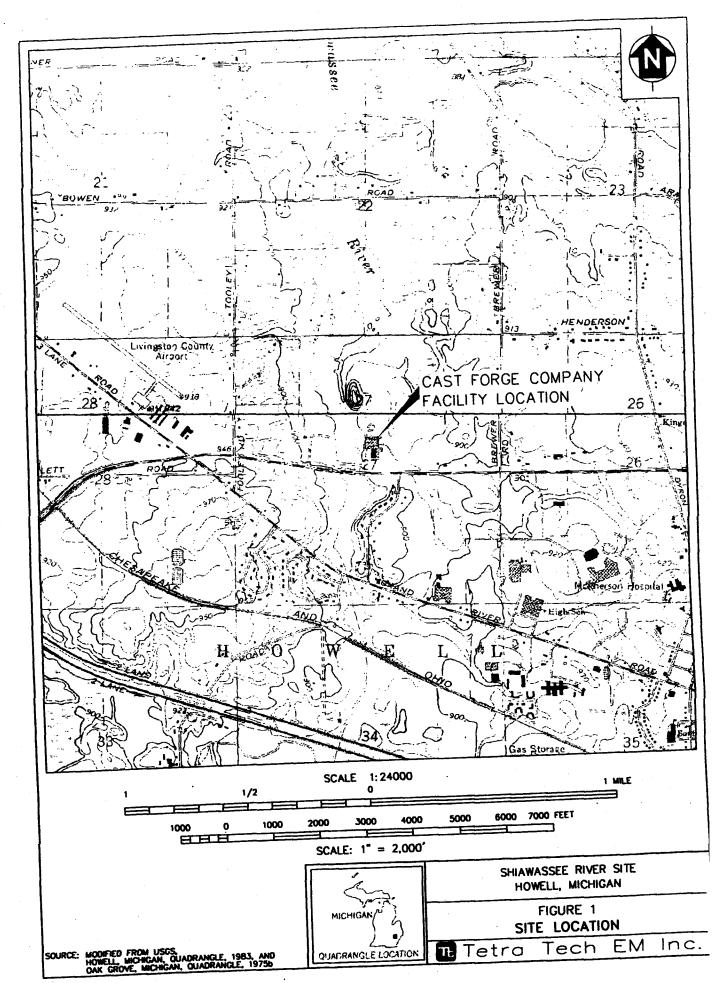
TABLE 2
SUMMARY OF EXCESS CANCER RISKS FOR HUMANS DUE TO PCB CONTAMINATION

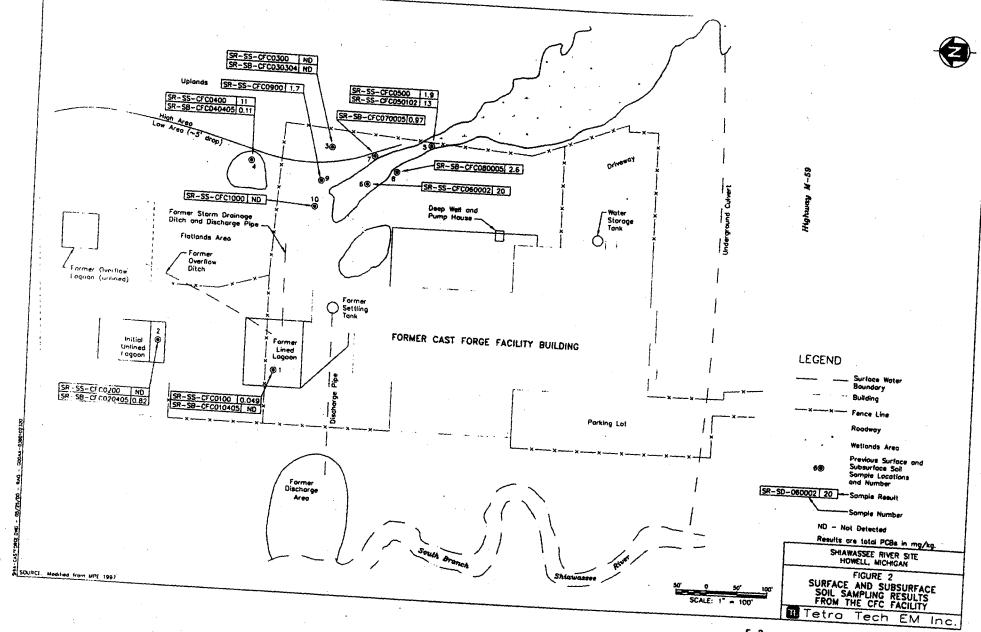
	P		
Category	CDI (mg/kg-d)	CR (unitless)	Percent of Total Cancer Risk
Nearby Resident - Current			
Ingestion of Fish Ingestion of Floodplain Sediment Dermal Contact with Floodplain Sediment	4.57e-03 2.33e-05 2.33e-05	3.52e-02 1.79e-04 1.79e-04	; ;
Ingestion of Garden Vegetables Ingestion of Beef Ingestion of Milk	1.14e-04 2.33e-04 <u>2.47e-04</u>	8.78e-04 1.79e-03 1.90e-03	e <sup>t</sup> andonamangue
TOTALS  Adolescent Swimmer - Current and Future		4.01 X 10 <sup>-2</sup>	97.8
Ingestion of River Sediment Dermal Contact with River Sediment TOTALS	9.95e-07 1.39e-07	7.66e-06 1.07e-06 8.73 X 10 <sup>-6</sup>	81.6
Wetlands Trespasser - Current and Future			
Ingestion of Soil Dermal Contact with Soil TOTALS	7.93e-06 1.11e-06	6.11e-05 <u>8.55e-06</u> 6.97 X 10 <sup>-5</sup>	. 100
Cast Forge Property Trespasser - Current			
Ingestion of Soil Dermal Contact with Soil TOTALS	2.58e-07 <u>3.61e-08</u>	1.99e-06 <u>2.78e-07</u> 2.27 X 10 <sup>-6</sup>	25.5
On-site (Cast Forge Property) Resident -Future			
Ingestion of Fish Ingestion of Soil Dermal Contact with Soil	4.57e-03 2.47e-06 2.47e-06	3.52e-02 1.90e-05 1.90e-05	
Ingestion of Garden Vegetables Ingestion of Beef Ingestion of Milk TOTALS	1.20e-05 2.33e-04 <u>2.47e-04</u>	9.24e-05 1.79e-03 <u>1.90e-03</u> 3.90 X 10 <sup>-2</sup>	95.1

CDI - Chronic Daily Intake

CR - Cancer Risk

Source: Pace/Warzyn, 1992



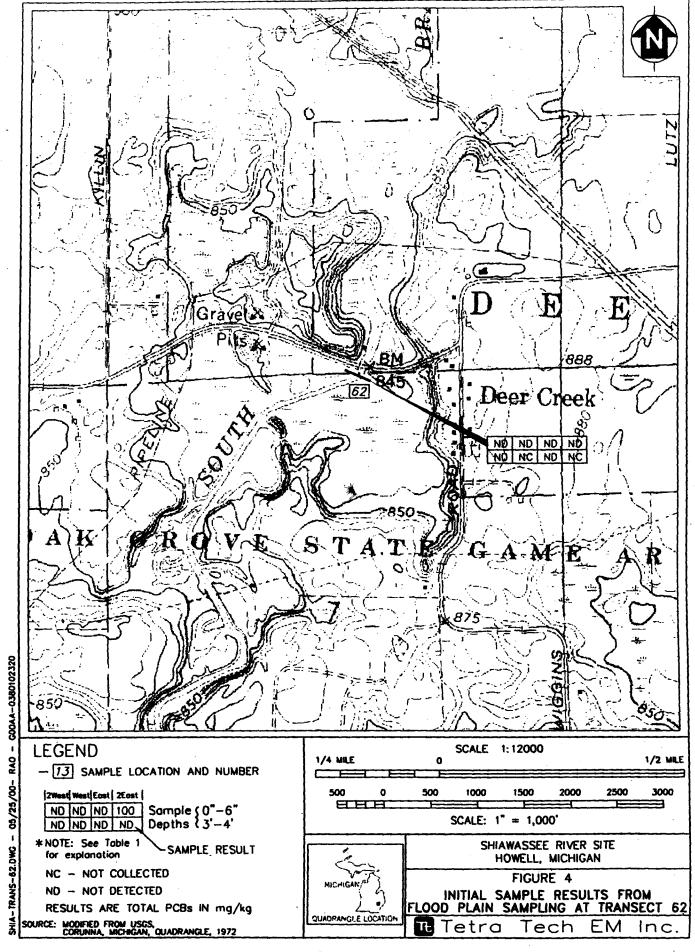


F-2

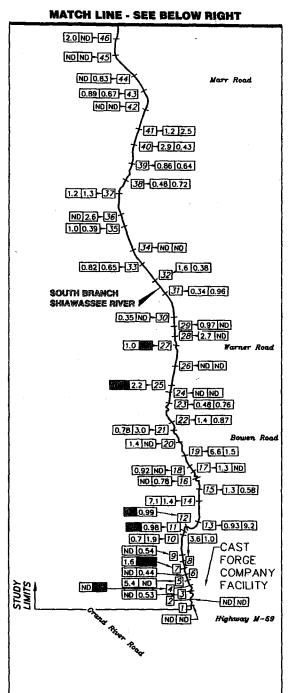
Tetra Tech EM Inc.

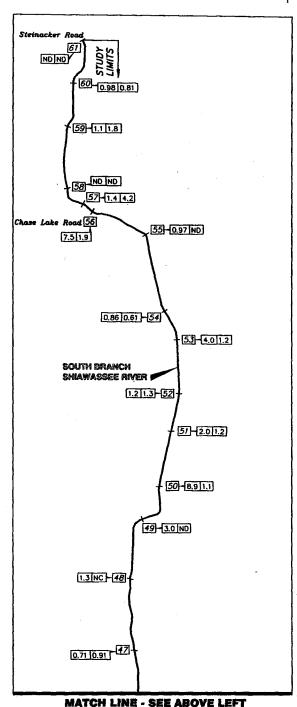
SCALE 1" = 2,000

MODIFED FROM USGS: HOWELL, MICHGAN, QUADRANGLE, 1983; DAK GROVE, MICHGAN, QUADRANGLE, 19756, AND MPE 1997









LEGEND

STUDY AREA PORTION
OF SHIAWASSEE RIVER

- 13 SAMPLING LOCATION AND NUMBER

NC - NOT COLLECTED
ND - NOT DETECTED
RESULTS ARE TOTAL PC8s IN mg/kg

1 1/2 SCALE 0 1: 24000 1 MRE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

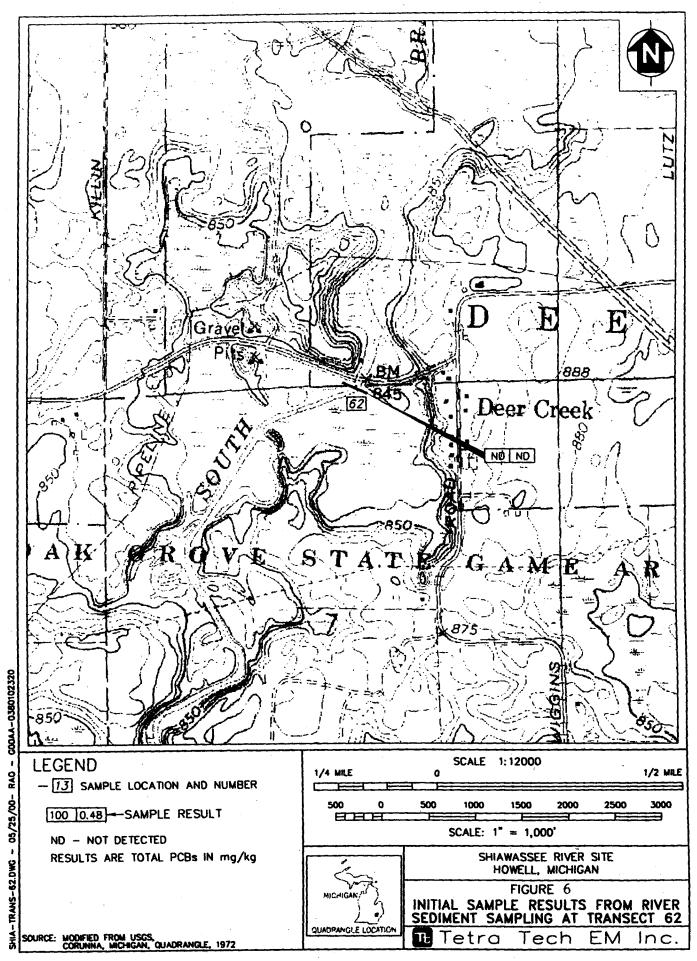
| SCALE 1" = 2,000"

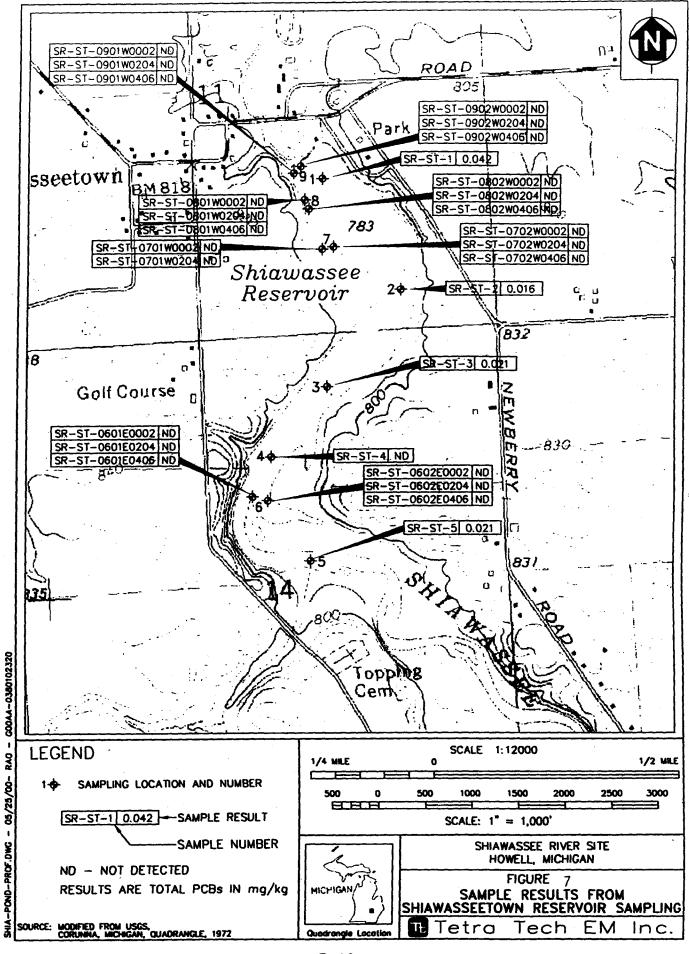
SOURCE: MODIFIED FROM USCS: SCALE 1" = 2,000"

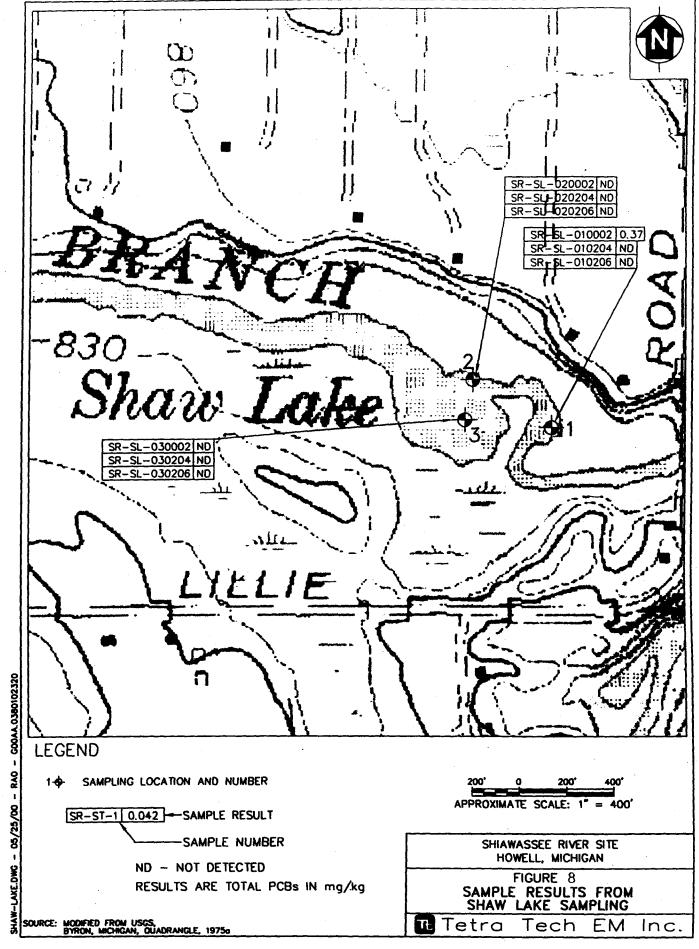
SOURCE: MODIFIED FROM USCS: HORIZING GUADRANGLE 1983: HORIZING GUADRANGLE 1983: HORIZING GUADRANGLE 19975b; AND MPE 1997



SHIAWASSEE RIVER SITE
HOWELL, MICHIGAN
FIGURE SEGULTS
FROM RIVER SEDIMENT SAMPLING
THE Tetra Tech EM Inc.







# APPENDIX RESPONSIVENESS SUMMARY SHIAWASSEE RIVER SITE HOWELL, MICHIGAN

# I. Responsiveness Summary Overview

In accordance with CERCLA 117, the U.S. Environmental Protection Agency (EPA) held a public comment period from July 9, 2001 through September 6, 2001 for interested parties to comment on the Proposed Plan (PP) for the final and only remedial action at the Shiawassee River Site in Howell. Michigan (the Site).

The PP provides a summary of the background information leading up to the public comment period. Specifically, the PP includes information pertaining to the history of the Site, the scope of the proposed cleanup action and its role in the overall Site cleanup, the risks presented by the Site, the descriptions of the remedial alternatives evaluated by EPA, the identification of EPA's preferred alternative, the rationale for EPA's preferred alternative, and the community's role in the remedy selection process.

EPA held a public meeting at 7:00 p.m. on July 18, 2001, at the Howell Carnegie District Library, 314 W. Grand River, in the city of Howell, Michigan to outline the remedial alternatives for the final action described in the PP and to present EPA's proposed remedial alternatives for remediating soil and sediment contamination at the Site.

The responsiveness summary, required by the Superfund Law, provides a summary of citizens' comments and concerns identified and received during the public comment period, and EPA's responses to those comments and concerns. All comments received by EPA during the public comment period are considered in EPA's final decision for selecting the remedial alternative for addressing contamination at the Site.

This responsiveness summary is organized into sections and appendices as described below:

- I. RESPONSIVENESS SUMMARY OVERVIEW. This section outlines the purposes of the Public Comment period and the Responsiveness Summary. It also references the appended background information leading up to the Public Comment period.
- II. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS. This section provides a brief history of community concerns and interests regarding the Site.
- III. SUMMARY OF MAJOR QUESTIONS AND COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPA RESPONSES TO THESE COMMENTS. This section summarizes the oral comments received by EPA at the July 18, 2001 public meeting, and provides EPA's responses to these comments.
- IV. WRITTEN COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPA RESPONSES TO THESE COMMENTS. This section contains the written comments received by EPA, as well as EPA's response to those written comments.

# II. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

Prior to the 1982 sediment removal by the State in the South Branch of the Shiawassee River, property owners along the river were contacted via mail to inform them of the removal action. The public response to this remedial effort is unknown because it occurred almost twenty years ago. On July 17, 1991, the Michigan Department of Natural Resources (MDNR) hosted an informal public meeting at the Howell Carnegie District Library to discuss the on-going RI/FS study. The meeting had an attendance of approximately five residents. More interest has been shown by adjacent property owners to the contaminated Site than any other, group until just recently when the Michigan United Conservation Clubs, from Lansing Michigan, requested an extension of the public comment period for this action.

On August 25, 1998, the Michigan Department of Environmental Quality (MDEQ) sent out a Proposed Plan announcing a public meeting and 30-day public comment period. The public meeting was held on September 10, 1998. No significant objections to the Proposed Plan were expressed by the public attending.

On July 6, 2001, U.S. EPA issued a revised PP. A public comment period was held from July 9 through August 7, 2001, but was extended to September 6, 2001 at the request of Michigan United Conservation Clubs, from Lansing, Michigan. A public meeting was held on July 18, 2001, to present the result of the Supplemental Feasibility Study (FS) and the preferred alternative as presented in the revised PP for the remedial action. The meeting was attended by local residents, the MDEQ, and a potentially responsible party (PRP) representative.

As part of EPA's responsibility and commitment to the Superfund Program, the community has been kept informed of ongoing activities conducted at the Site. EPA has established a repository at the Howell Carnegie District Library, where relevant Site documents may be viewed. Documents stored at the repository include:

- The final Remedial Investigation (RI)/ Feasibility Study (FS) for the Site;
- The Proposed Plan (PP) issued by the MDEQ;
- <sup>o</sup> Fact sheets summarizing the technical studies conducted at the Site;
- Data Evaluation Report;
- The Supplemental Feasibility Study (FS);
- The revised PP for this action at the Site;
- Public Meeting Transcript for both Public Meetings.

EPA's selection of a remedy to clean up the contamination at the Site is presented in a document known as a Record of Decision (ROD). The ROD and the documents containing information that EPA used in making its decision (except for documents that are published and generally available) will also be placed in the information repository, as will this responsiveness summary.

# III. Summary of Major Questions and Comments Received During the Public Comment Period and EPA Responses to These Comments

Oral comments raised during the public comment period for the Site remediation have been summarized below together with EPA's response to these comments.

COMMENT: A local resident strongly stated that no remediation should be conducted on the river based on the presentation given and that no further investigation should occur as well.

RESPONSE: The no action alternative for the river was not the alternative chosen because it is not protective of human health and the environment as explained in the ROD. Long-term monitoring will be part of the selected remedy to demonstrate that natural recovery is occurring in the river.

COMMENT: Ms. Krajcovic made a statement for the MDEQ: (1) MDEQ does not support the PP; the remediation of the sediments Shiawassee River should be to 0.33 mg/kg: The basis for this is from MDEQ's Surface Water Division. This cleanup goal would eventually eliminate the need for the current fish advisory for the Shiawassee River: (2) If the Toxic Substance Control Act is (TSCA) determined to be an applicable or relevant and appropriate requirement (ARAR) for the Site, the floodplain soil must be remediated to 1 mg/kg, not the 10 mg/kg proposed; (3) The Wetlands Protection Act should be included as an ARAR; (4) The estimated six hot spots to be remediated which is based on data developed from the supplemental investigation ignores the probability that other hot spots are present and therefore a statistical analysis of the EPA data indicates that there is a high probability of additional hot spots occurring in the river between the additional hot spots. These additional hot spots must be remediated; (5) the PP only addresses the first river mile of an eight mile length of contamination; MDEO contends that the entire stretch of the eight miles must be remediated; and (6) because contamination will be left in place institutional controls must be in place and long-term monitoring must be implemented to assess the effectiveness of the remedy.

RESPONSE: (1) and (5) Remediation to 0.33 mg/kg for the first eight miles of river was determined not to be cost-effective. A remedial action of this magnitude would likely pose serious adverse effects to the flora and fauna along the eight miles of the river.

RESPONSE: (2) The TSCA PCB mega rule is an ARAR for the site, but it does allow for the soils and river sediment remediation to be risk-based. The risk-based cleanup selected in this ROD, including the 10 mg/kg cleanup level for soils, does comply with TSCA.

RESPONSE: (3) Agreed. The Wetlands Protection Act will be included as an ARAR.

RESPONSE: (4) See the response to the similar written comment below. It should be noted however that predesign sampling will be performed to reduce the risk of missing other hot spots in the area of the river being remediated.

RESPONSE: (6) Institutional controls along with a deed restriction will be placed on the former Cast Forge Company facility. Long-term monitoring will be part of the selected remedy to demonstrate that natural recovery is occurring in the river.

# IV. Written Comments Received During the Public Comment Period.

The written comments regarding the Site have been summarized below, together with EPA's responses to these comments.

# The MDEQ submitted additional comments in writing:

COMMENT: The revised PP indicates, for both Alternatives 3 and 4, that waste will remain in place above ARARs (Michigan Act, Part 201) -based cleanup criteria of 1.0 or 4.0 mg/kg for floodplain soil and 0.33 mg/kg for sediment (as well as above the EPA selected 5 mg/kg criterion). Therefore, some form of institutional controls or deed restrictions are necessary wherever this would occur.

RESPONSE: Michigan Act, Part 201 is not an ARAR as it applies to the river because sediment is not listed as one of the land use categories in the law. In addition, floodplain soils are being remediated pursuant to TSCA. Since TSCA is applicable, the cleanup criteria cited by MDEQ are not relevant. Finally, institutional controls (other than the fish advisory) or deed restrictions are not appropriate for a river.

COMMENT: The concept of the surface weighted average concentration (SWAC) appears to be an acceptable method for identifying hotspots and determining areas for cleanup. However, the success of the EPA strategy depends on locating and removing a majority of the contaminated sediments and soils and the data used to conduct the SWAC procedure are inadequate for reliable identification of hotspots. It is also unclear how SWAC was applied to this evaluation, whether the excavation areas and volumes to be excavated were calculated by the SWAC, or if it was used to demonstrate hotspot existence with the excavation volumes by some other means. The MDEQ continues to have reservations as to the validity of the natural neighbor estimate of total hotspot areas for two reasons. First, the estimated total hotspot areas is based on the six hotspots located and ignores the probability that other hotspots were not detected. Second, the unequal probability sampling theory appears better suited to the detection of hotspots and the estimate of total hotspot area developed according to this method is unbiased regardless of how the boundaries of the hotspots are drawn. A statistical analysis of the EPA data using the unequal probability sampling theory indicates that there is a high probability of additional hotspots occurring in the river sediments between the EPA identified hotspots. The potential additional hotspots must be accounted for during remedial design and any found must be remediated during the remedial action.

RESPONSE: Given the historical trend of the data based on previous sampling events which shows the contamination to be decreasing steadily, the high probability the MDEQ cites for missing hotspots does not correlate with the empirical data. Predesign sampling will be performed to avoid missing any additional hotspots in the first river mile.

EPA has addressed MDEQ's concerns and explained the procedure several times with regard to SWAC. The estimates of volume are based on removal of contaminated sediment above the various threshold values and are not derived from the SWAC. The SWAC values are dependent upon the removal threshold and are a means to examine various removal scenarios in relation to the sediment PRGs established for the site.

COMMENT: The revised PP presents multiple sampling and cleanup segments of the river as the Site. The entire revised PP should refer to the 8 mile portion proceeding north

from the Cast Forge Corporation facility, as addressed in the Consent judgement, unless justification is presented to reduce this area.

RESPONSE: The revised PP did refer to the 8 mile portion as "the historical site". Additional sampling and cleanup segments were discussed but were not referenced as the Site.

COMMENT: In the discussion of natural recovery near the end of the revised PP section, reference is made to PCB's breaking down or otherwise being lost to the river. This language needs to be changed. At the July 18 public meeting, the EPA acknowledged that there is no significant degradation of PCBs in the environment and there is no evidence of this having occurred in the Shiawassee River. The most likely mechanism of concentration reduction is remobilization and transport to other areas of the river and flood plain rather than "lost from the river".

RESPONSE: There is evidence that dechlorination (breaking down) of the PCBs at the Site is occurring, although it is not significantly reducing the contamination at the Site. It is agreed that a majority of the PCBs are dispersed to other areas of the river and floodplain.

#### **Other Written Comments:**

COMMENT: EPA must consider the recommendations of independent expert bodies, particularly the findings and recommendations of the National Academy of Sciences ("NAS") Committee on PCB Contaminated Sediment Risk-Management issued this year ("2001 NAS PCB Contaminated Sediment Risk-Management Report"), when choosing sediment remedies.

RESPONSE: The study referenced was considered when selecting the remedy for the Site.

COMMENT: The sediment remedy selection must be made based on site-specific factors, as required by EPA guidance and strongly endorsed by the 2001 NAS PCB-Contaminated Sediment Risk-Management Report.

RESPONSE: The selected remedy for sediments is based on the site-specific factors cited in the NAS Report.

COMMENT: The conditions at this Site satisfy the criteria for natural attenuation outlined in EPA guidance and the 2001 NAS PCB-Contaminated Sediment Risk-Management Report.

RESPONSE: An alternative which evaluated natural recovery only with institutional controls could have been included in the Feasibility Study, but would not have been selected based on the nine criteria.

COMMENT: Because natural attenuation is occurring, there will be a continued decrease in PCB concentration that will occur each year after the sediment remedy is implemented (and even if the sediment remedy were not implemented).

RESPONSE: EPA acknowledges the above comment.

COMMENT: All of the remedial alternatives described in the Supplemental Feasibility Study ("Supp. FS") (including the no action alternative) decrease the average PCB concentration in sediment located within the initial five miles downstream of the Cast Forge facility to 0.1 ppm or less in 10.4; 9.4, and 7.7 years if removal levels of 10 ppm, 5 ppm, or 1 ppm are used, respectively (see Figure 1: Plot of residual PCB concentration sediment from the first five miles of the Shiawassee River after dredging from 2002 to 2072 assuming no action and PCB sediment removal levels of 25 ppm, 10 ppm, 5 ppm, 1 ppm, and nondetect (0.333 ppm)). In short, the only difference between the remedial alternatives is the time that it takes to attain a PCB cleanup goal. Thus, the only "benefit" of the lower removal level (i.e., 5 ppm, 1 ppm, or MDEQ's proposed nondetect goal) is a slightly shorter cleanup timeframe.

The risks posed by implementing each alternative (e.g., sediment resuspension, destruction of ecosystem, worker safety) and the adverse impact on riparian landowners increase substantially as the removal level decreases below 10 ppm. Removal of all sediment containing PCB concentrations of 1 ppm or greater would virtually guarantee the destruction of the local ecosystem. It should be beyond debate that removal of all of the sediment containing any detectable levels of PCBs will eliminate completely the ecosystem in all of the areas in which dredging occurs and result in a devastating adverse impact in the remainder of the river.

RESPONSE: EPA acknowledges the inherent trade-off between ecosystem disturbance associated with sediment cleanup and the need to reach risk-based cleanup levels as quickly as possible. EPA believes that Alternative 3b provides the most cost-effective cleanup and best balances these trade-offs.

COMMENT: There are no sediment cleanup goals set in Federal or State regulation and none is needed at this Site. Neither the State proposed cleanup goal of the detection limit nor EPA's range of sediment screening levels of 0.002 ppm to 0.2 ppm is an appropriate residual cleanup goal concentration for sediment at this Site. These screening levels are based on other aroclor mixtures than the one at this Site. The EPA and MDEQ screening level at this Site are inconsistent with other screening levels developed by EPA and with several Federal guidances on assessing the ecological impact of sediments, particularly since they do not reflect site-specific data. Finally, these screening levels do not take into account the significant scientific uncertainties in assessing the ecological risk at this Site and are infeasible.

No numerical sediment cleanup concentration need be set. As EPA's ecological risk assessment guidance candidly admits concerning ecological risk generally, "[t]here is no magic number that can be used." At numerous Superfund sites, EPA has only selected a sediment removal level, not a residual cleanup level. For example, at this Site, MDEQ only selected a removal goal, not a residual concentration goal, in its 1998 Proposed Plan.

RESPONSE: The EPA ecologically-protective sediment PRGs of 0.002 to 0.2 ppm are not screening levels. They are based on site-specific sediment and fish data and food-chain modeling to the receptor.

In one comparative study, complete reproductive inhibition in mink by Aroclor 1242 occurred at a dietary concentration of 5 ppm, compared to 2 ppm Aroclor 1254 (Bleavins, et al. 1980). The approximately factor of 2 difference is small (generally order of magnitude differences are considered significant when comparing the toxicity of different chemicals). Therefore, accounting for the difference in PCB composition would have

minor effects on the outcome. (The most comprehensive toxicological research has been done for Aroclor 1254, and was used in the ERA. There is little research on the toxicological effects of Aroclor 1242).

COMMENT: The remedial alternatives which require the removal of sediment containing less than 10 ppm are not cost-effective (particularly as the PCB removal level decreases below 5 ppm). The cost of the remedial alternative increases from \$408.000 if a sediment removal level of 10 ppm is utilized to \$1.6 million if 1 ppm is the removal level and to at least \$2.7 million if the detection limit is used (a factor of 3.9 and 6.6 increase in cost, respectively). In other words, to remove the last 3% of PCBs in the sediment, the cost per kilogram of PCBs removed increases from \$2,100 for a 10 ppm removal level to \$34,000 for a nondetect removal level (a factor of more than 15 increase). If a 1 ppm removal level is used instead of 10 ppm, the residual concentration immediately after dredging only decreases from 1.22 ppm to 0.64 ppm. More importantly, however, since natural attenuation continues to reduce the PCB concentration after dredging, the only benefit is to decrease the time it takes to attain a mean residual level of PCBs in sediment of 0.002 ppm from 26.7 years to 24.0 years. In fact, the long-term residual PCB concentrations is essentially the same for all removal levels after 10 to 15 years.

RESPONSE: Remediating the first river mile to 5 mg/kg PRG reduces the overall SWAC for the first five miles from 3.0 to 1.06 mg/kg. The reductions in SWAC from applying the 5 mg/kg PRG for the first five miles would lower the SWAC from 3.0 to 0.99 mg/kg. Based on a 3 to 1 reduction in SWAC and the relatively low cost of the remediation EPA determined the remedy to be cost-effective and consistent with EPA policy.

COMMENT: What is the difference from the PP and the plan proposed by Cast Forge back in 1981.

RESPONSE: The sediment removal project proposed back in 1981 was intended to clean up a total of eight miles of the river, it ended in 1982 after extending only 1.5 miles downstream, due to the costs of the removal being higher than anticipated. The selected remedy requires that PCB-contaminated sediment will be remediated so that the five mile reach beginning at M-59 of the river will reach an average PCB sediment concentration of approximately 1 mg/kg immediately after active remediation and utilizes natural recovery over time to achieve the PRGs

COMMENT: PCB levels were measured at 530 mg/kg in 1975 and in 1992 at 700 mg/kg. The increase in concentration is disturbing.

RESPONSE: Without reference to a specific location it is not possible to respond. The historical trend of all the data based on previous sampling events shows the overall contamination to be decreasing steadily.

COMMENT: The use of natural recovery beyond the first river mile to attain the PRGs is of concern.

RESPONSE: Post-remediation monitoring will be required to ensure that natural recovery of the river is occurring. Again, the historical trend of all the data based on previous sampling events shows the contamination to be decreasing steadily, and therefore, natural recovery is an appropriate remedy.

COMMENT: What started out as fish advisories on a limited section of the river has now grown to the entire extent of the river.

RESPONSE: Fish advisories downstream of the Shiawassee Reservoir (40 miles downstream) cannot be attributed to this Site. There is no contamination in the Reservoir and the river water tested found no detectable levels of PCBs.

COMMENT: The SWAC procedure raises many questions. Using U.S. EPA data from the site, one independent consultant suggests that the remedy will only remove 38% of the volume above 10 mg/kg. (The independent consultant's report was attached to the commentor's letter).

RESPONSE: The report provided is clearly marked draft, and although it appears to have been prepared by a consultant to the MDEQ, U.S. EPA is not certain whether the report is considered to be a publicly released document by the MDEQ. In reviewing the report, U.S. EPA believes that the statistical evaluation of the Shiawassee River data provided therein would be more appropriate to the remedial design stage. Since the first mile of the river will be resampled prior to sediment cleanup, U.S. EPA will ensure that a statistically valid approach is utilized so that the sediments which exceed the 5 mg/kg threshold will be located and remediated.

COMMENT: Does EPA have post-remediation monitoring data from other sites that validate the use of SWAC.

RESPONSE: No remediation has yet been performed at a Site that utilized the SWAC approach, but this information will be developed at this and other sediment sites to provide additional reassurance to the public that the approach is valid.

COMMENT: What is the basis for 0.003 to 0.2 mg/kg PCB PRG as a protective range?

RESPONSE: The PRGs for the Shiawassee River Site were developed in August 2000 as a re-evaluation of the ecological assessment performed in 1995.

COMMENT: Does 0.003 to 0.2 mg/kg PCB PRG protect children and/or a human fetus or is this the range calculated for a 70 kilogram adult?

RESPONSE: The basis for the 0.003 to 0.2 mg/kg PCB PRG is fish-eating mammals (specifically, mink). Based upon the results of the human health and ecological risk assessments, fish-eating mammals are at most risk from the PCB-contaminated sediment. U.S. EPA did consider adult consumption of fish as a pathway of human exposure. U.S. EPA certainly agrees that fetal exposures and maternal body burden are important considerations, and it would have been preferable to assess these endpoints. However, no toxicity factors for these endpoints exist at this time. U.S. EPA therefore looked at all endpoints U.S. EPA could, i.e. those that are in IRIS. Short of deriving a new, non-peer reviewed toxicity factor, this type of assessment is not possible at this time.

COMMENT: Based on the combination of excavation/ dredging and natural recovery, what is EPA's best estimate of time required to achieve the SWAC range of 0.003 to 0.2 mg/kg PCBs throughout the study area.

RESPONSE: If the remediation were complete today it would take an estimated seven years to achieve an overall SWAC of 0.2 mg/kg PCBs based on the trend of historic PCB

analytical data and comparing this trend with existing (1999) SWAC numbers and the PRG SWAC of 0.2 mg kg. To reach the PRG of 0.003 mg/kg PCB it is estimated to take an estimated eighteen to twenty years.

COMMENT: How does Alternative 3b facilitate the elimination of the current fish advisory.

RESPONSE: Remediation of the first river mile will reduce the SWAC from 3.0 to 1.06 for the first five miles of river. Again, the historical trend of all the data based on previous sampling events shows the contamination to be decreasing steadily, and therefore, natural recovery is an appropriate component of the remedy. Achieving the SWAC range of 0.003 to 0.2 mg/kg PCBs throughout the study area should eliminate the current fish advisories.

COMMENT: If natural recovery is to be a significant component of the remedy, why do hot spots remain after the 1982 remediation of the first river mile?

RESPONSE: Only six sediment locations have PCB levels above 10 mg/kg in the first 1.5 river mile and four in the first mile. The contamination in the sediment may be attributable to PCB migration from the floodplain to the sediments as part of the natural recovery process. They could also be hotspots missed during the remediation of the first mile that had significantly higher concentration levels previously and had naturally recovered. Analysis of the historic data clearly shows PCB contamination decreasing steadily over time and there is no reason to expect this trend to change, which is the basis for natural recovery to be a significant component of the remedy.

COMMENT: If translocation is a component of natural recovery, where are the most likely locations of redeposition and how will they be assessed and/or remediated?

RESPONSE: Dispersion of the PCB contamination has not resulted in detectable redeposition of the contamination in any downstream locations due to the significant mixing of sediments as the PCBs move downstream.

COMMENT: What is the depth of remediation in the floodplain and the river?

RESPONSE: The depth was assumed to be 1 foot for cost estimation purposes because the sediment is typically not very deep. Remediation will be performed to whatever depth is necessary to remove all PCBs in the area delineated for removal.

COMMENT: Treatment of water generated during the cleanup process and any state discharge requirements are not addressed in detail in the Proposed Plan.

RESPONSE: Water generated during the cleanup was considered during remedy development and will be handled appropriately and in conformance with any state discharge requirements. U.S. EPA does not anticipate any insurmountable problems with this. These details will be developed during the remedial design.

COMMENT: Table 1 of the FS provides 30 pages of 1999 sampling information and analytical results for a series of Arochlor mixtures. As noted in Section 1.3.3, 10% of the samples were sent to an off-site laboratory for confirmation. Please explain the following:

1) The FS is silent relative to a comparison of data from the two laboratories;

- 2) The data indicate use of widely different detection limits, but no comments as to the basis of the difference:
- 3) The data demonstrate significant levels of both Arochlor 1248 and Arochlor 1242 whereas use of PCBs by Cast Forge was limited to Arochlor 1242.

RESPONSE: 1) On page 35 of the Data Evaluation Report it states, "There are no apparent qualitative differences between Brighton and the Contract Laboratory Program" and on page 36 concludes, "Overall, the results (PCB analysis) in Appendix A are usable as qualified for any purpose".

RESPONSE: 2 & 3) On page 35 and 36 of the Data Evaluation Report it explains the issues raised in the two comments:

The analyses went as well as can be expected from the nature of the samples. There are two general problems that complicated these analyses, interference and degradation.

The electron capture detector used in this method is not specific to PCB. It responds to all electrophilic (electron-attracting) compounds. It is very sensitive to organic compounds containing halogens (fluorine, chlorine, bromine, and iodine), nitrogen, and oxygen. It is fairly sensitive to some other organic compounds, including polynuclear aromatic hydrocarbons (PAH). PAH are the major products of incomplete combustion and are also found in heavier petroleum products, in creosote, and elsewhere. In several cases the mass of non-target compounds interfered with determination of PCBs. Therefore, Brighton treated the extract to remove at least some of the interferents. Occasionally, a re-extraction was also necessary. The results in Appendix A are the best available. However, it is not impossible that some of the reported PCB are actually non-PCB compounds that chromatographed with the PCB. The only practical way to obtain absolute proof that the reported PCBs are actually PCBs is to use mass spectroscopy methods, which have detection limits considerably higher than the Method 8082 used here.

The other problem is that the samples appear to be degraded (weathered) PCB mixtures. The major degradation process for PCBs is dechlorination. Because of this slow, gradual chemical change, the chromatographic patterns change over time. For instance, over time Aroclor 1248 will become practically indistinguishable from Aroclor 1242. The patterns seen in these samples are rarely close matches to the patterns in the (undegraded) standard chromatograms. Therefore, the analyst must determine which Aroclor each sample best fits. Each Aroclor is quantitated from five peaks, by multiplying each sample peaks area by its response factor and averaging the five results. Therefore, the choice of Aroclor directly affects the reported concentration. (An example of this can be seen in sample SR-SB-0901EN0304 and its field duplicate, discussed above.) Brighton appears to have done well at the Aroclor identification, but there are many samples where two analysts may draw different conclusions. Therefore, all results from the CLP analyses are considered compatible with the Brighton results.

Overall, the results in Appendix A are usable as qualified for any purpose.

COMMENT: The commentor stated that he did not agree with the Alternatives presented

in the PP for the Site and that he had no assurances that the Selected Alternative would achieve the PRGs of 0.003 to 0.2 mg kg PCBs

RESPONSE: Analysis of the historic data clearly shows PCB contamination decreasing steadily over time and there is no reason to expect this trend to change, which is the basis for natural recovery to be a significant component of the remedy.

Remediating the first river mile to 5 mg/kg PRG reduces the overall SWAC from 3.0 to 1.06 mg/kg. The reductions in SWAC from applying the 5 mg/kg PRG for the for the first five miles would lower the SWAC from 1.06 to 0.99 mg/kg. Based on a 3 to 1 reduction in SWAC and the relatively low cost of the remediation EPA determined the remedy to be cost-effective and consistent with EPA policy.

# APPENDIX B



Final Remedial Design
for the
Shiawassee River
Superfund Site
Revised August • 25 • 2004

2440 West Highland Road Howell • Michigan

Prepared for: Dennis P. Reis Dennis Reis, LLC

Prepared by:



# FINAL REMEDIAL DESIGN

# For The

# SHIAWASSEE RIVER SUPERFUND SITE

# Prepared by:

ENTACT & Associates LLC 1010 Executive Court Suite 280 Westmont, IL 60559

> July 9, 2004 Revision: 0

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#### LIST OF ACRONYMS/ABBREVIATIONS

ARARs Applicable or Relevant and Appropriate Requirements

ASTM American Standards for Testing Materials

UAO Unilateral Administrative Order

BNA Base-Neutral-Acid Extractables (Semivolatile Organics)

CERCLA Comprehensive Environmental Response, Compensation, and Liability Act (Superfund)

CFC Cast Forge Facility
COC Chain of Custody

DCF Document Control Format
DOO Data Quality Objective

FSFS Final Supplemental Feasibility Study FSP Field Analysis and Sampling Plan

FSS Field Services Section
HASP Health and Safety Plan
LGP Low Ground Pressure

MDEQ Michigan Department of Environmental Quality

MDLs Method Detection Limits

MDNR Michigan Department of Natural Resources
MS/MSD Matrix Spike/Matrix Spike Duplicate

NPL National Priorities List QA Quality Assurance

QA/QC Quality Assurance/Quality Control
QAPP Quality Assurance Project Plan

QLs Quantitation Limits
PCBs Polychlorinated Biphenyls
PRG Preliminary Remediation Goal

RAL Remedial Action Level
RAS Routine Analytical Services

RCRA Resource Conservation and Recovery Act
RI/FS Remedial Investigation/Feasibility Study
RD/RA Remedial Design/Remedial Action

ROD Record of Decision

RPD Relative Percent Difference RPM Remedial Project Manager SAP Sampling and Analysis Plan

SARA Superfund Amendments and Reauthorization Act

SF Superfund

SMC Sample Management Coordinator SOP Standard Operating Procedure

SOW Statement of Work

SVOC Semi-volatile Organic Compounds SW-846 Test Methods for Evaluating Solid Waste

TSA Technical System Audit

USACE United States Army Corps of Engineers

USEPA United States Environmental Protection Agency

VOC Volatile Organic Compound

# 1.0 INTRODUCTION

#### 1.1 PURPOSE AND OBJECTIVES

In accordance with the objectives set forth in the Unilateral Administrative Order (UAO), the Statement of Work (SOW) (Appendix A of the RD/RA Work Plan), and the Record of Decision (ROD), for the Shiawassee River Superfund Site in Howell, Michigan, ENTACT, Inc. (ENTACT) has developed this Final Design Document, on behalf of Johnson Controls Inc (JCI), to define the procedures and methodologies to be used in implementing the approved remedial action (RA) at the Shiawassee River Site. In accordance with the approved RD/RA Work Plan, dated August 2002, the Final Design for the RA was determined following an evaluation of the results by the U.S.EPA of the Pre-Design Investigation (PDI) conducted by ENTACT between March and July 2003 and summarized in the PDI Report, dated August, 2003.

The objective of this Pre-Final Remedial Design document is to provide for the safe and efficient completion of the approved remedial action. This document includes a comprehensive description of the RA to be performed and a schedule for completion of each major activity and submission of each deliverable. All field sampling and laboratory analysis conducted as part of the RA will follow the procedures outlined in the approved Field Sampling and Analysis Plan (FSAP) (Appendix D to the RD/RA Work Plan) and the approved Quality Assurance Project Plan (QAPP), dated August, 2002.

- Section 1: Introduction This section provides a description of the Site, including the location and history.
- Section 2: Project Organization and Management This section provides a description of the project team, project organization, and responsibilities.
- Section 3: Scope of Work Tasks This section includes a description of the main tasks defined in the SOW, including project plans, RD phases, and RA/Construction and document submittal requirements.
- Section 4: Remedial Action— This section describes the major remedial activities that will be implemented during the RA pursuant to the amended ROD and the SOW.
- Section 5: Reporting— This section describes the reporting activities that will be performed during the execution of the RA of the RA.
- Section 6: References This section lists the references used in the generation of the Pre-Final Design document.

The herein described Pre-Final Design document is based on the Site findings provided in the Site Record of Decision (ROD), the UAO and the associated Statement of Work (SOW) (Appendix A to the RD/RA Work Plan). The SOW required the performance of a PDI prior to execution of the Remedial Action. The PDI has been completed, and this Pre-Final Design reflects the findings of that investigation.

#### 1.2 SITE LOCATION AND DESCRIPTION

The Shiawassee River Site consists of identified PCB-contaminated soils on the Hayes Lemmerz International (Hayes Lemmerz) property and identified areas of soils and sediments along an eight-mile segment of the South Branch of the Shiawassee River immediately to the west, and downstream, of the Hayes Lemmerz property. The Hayes Lemmerz facility is located approximately one mile northeast of the City of Howell (population: 8,100), in Howell Township, Livingston County, Michigan. The Facility address is:

Hayes Lemmerz International 2440 West Highland Road Howell, MI 48843-0250

The Site is accessed directly from Highway 59 (West Highland Road). The facility was formerly owned and operated by the Cast Forge Company (CFC) and is described as such in pre-RD/RA investigation and feasibility study reports. To maintain document continuity, the facility will be described in this document as the former "Cast Forge Facility" or former "CFC property". The former CFC property and surrounding vicinity are illustrated in Figure 1.

The former CFC property is approximately 51 acres in size and is surrounded by areas of mixed land use, including farming, light industrial operations, residential properties and undeveloped forests and fields. The property is bordered on the north and east by wetlands, to the west by the South Branch of the Shiawassee River, and to the south by Michigan Highway 59. The developed southern end of the facility property consists of the main facility building and several open parking and equipment storage areas. Most of the former treatment/storage lagoons and ditches have been backfilled with gravel and are currently used as above ground storage areas. Investigation borings at the site indicate that the upper five feet of native soils are composed of well-drained, medium to fine-grained sands, with increasing fines grading downward.

The developed portion of the property is relatively flat and drains predominantly to a wetlands to the east of the facility building (Figure 2). The wetland is classified as palustrine, forested and/or vegetated with scrub or shrub, with a non-tidal water regime that is saturated, semi-permanent and/or seasonal (USCS 1993). An underground culvert, running from the eastern wetland area beneath the facility property to the Shiawassee receives flow from the wetland area to the east of the facility as well as from another palustrine wetland area south of M-59 (MPE 1997).

The Shiawassee River is 20 to 45 feet in width, with a reported average width of 25 feet during normal stream flows. River flow is to the north into the main stem of the Shiawassee River, which eventually flows into Lake Huron. Portions of the River downstream of the former CFC facility have been channelized and straightened presumably for the purposes of flood control. Channelization activities were believed to have been performed in the 1940s (MPE 1997). The frequency of channelized river segments increases beyond River Transect 28, approximately 1.5 miles downstream from the former CFC facility. The depth of water under summer low flows is one to two feet, with scour depths of up to five feet along the outer edge of river bends. The nominal flow in 1982 was 15 cubic feet per second (cfs) during the late summer. Peak flood flows during spring in 1982 were 75 cfs. The adjoining 100-year floodplain is 50 to 300 feet wide along

the first downstream river mile. The floodplain is heavily overgrown with interspersed woodland and marshy areas. Land use adjacent to the Shiawassee River is predominantly agricultural or undeveloped.

Regionally, the topography slopes gently north with occasional low discontinuous hills and low-lying, glacially-derived kettle lakes and lowlands. The average area ground surface elevation is approximately 900 feet above Mean Sea Level (ft msl). The facility area is underlain by unconsolidated glacial till consisting of predominantly clays and silts and interspersed sand units. River and floodplain soils are underlain by more recent alluvial deposits and Carlisle muck soils (Warzyn 1992).

#### 1.3 SITE HISTORY

# 1.3.1 Site Operations

The facility is presently active in the manufacture of one-piece cast aluminum wheels for automobiles, and heavy-duty vehicles. The current owner of the facility is Hayes Lemmerz International, Inc., (Hayes Lemmerz), a major global supplier of automotive brake and drive train components, structural components and aluminum and steel wheels to the automotive industry. The Corporate offices for Hayes Lemmerz are located in Northville, Michigan. On December 5, 2001, Hayes Lemmerz filed a voluntary petition for the reorganization of several of its domestic manufacturing subsidiaries, including the Howell, Michigan facility, under Chapter 11 of the Bankruptcy Code.

Previously, the property was owned and operated by Hoover Ball and Bearing Company (Hoover) from 1964 to 1969. The original facility building was reported to have been constructed by Hoover during that time. In 1969, the Site was purchased by the Cast Forge Company (CFC) and produced aluminum die cast wheels until 1981, at which time the facility was sold to Kelsey Hayes/Western Wheel, now Hayes Lemmerz, the current owner of the facility.

During the period 1969 through 1981, the CFC facility manufactured aluminum die cast automotive wheels and other components using polychlorinated biphenyl (PCB)-containing oils as a lubricant in the manufacturing process from 1969 through 1972. In 1972, the plant changed to a phosphate ester lubricant, but residual PCBs reportedly remained in the die casting equipment until 1976 when it was removed by flushing (Warzyn, 1987). During the period from 1969 to 1974, CFC reportedly discharged process cooling water reported contaminated with PCB-containing oils to an unlined surface lagoon located to the north of the facility building (Refer to Figure 2). This lagoon reportedly overflowed into a drainage ditch running directly into the Shiawassee River (MPE 1997).

# 1.3.2 Environmental Investigations

The first reported detection of PCBs in the environment near the CFC facility occurred in 1974, when routine stream sediment sampling performed by the Michigan Department of Natural Resources (MDNR) detected PCBs in the sediments of the Shiawassee River downstream of the CFC facility (MPE 1997).

State-lead sediment and/or fish sampling events of the Shiawassee River downstream of the CFC facility were performed in 1977 and 1981 and found both the sediments and sampled aquatic life contained PCBs (MPE, 1997).

After reports of an unauthorized discharge at the Site in 1978, the MDNR sampled the soils on the CFC facility property and reported total PCBs as high as 41,000 mg/kg (basis unknown) (MPE, 1997) in Site soils. Another reported unauthorized discharge in 1978 resulted in the MDNR installing three shallow groundwater wells around the former lined wastewater lagoon. Sampling of these wells detected low concentrations of PCBs in the groundwater. These findings resulted in the MDNR filing suit against CFC to address the observed PCB contamination of on-site soils and sediments (refer to Section 1.3.3), that resulted in a 1982 partial remedial action removing contaminated soils from the facility property and Shiawassee River and floodplain soils directed by the MDNR.

In 1980, CFC contracted Environmental Research Group, Inc., to replicate the 1978 on-site results established by the MDNR, and to perform additional sediment and aquatic life sampling to a distance 10 miles downstream of the facility. The investigations found no PCBs in the Site groundwater but detected elevated PCBs in soils at a depth eight feet below grade in the area of a former Site drainage ditch.

Between 1974 and 1998, the MDNR completed various biota, river sediment/floodplain soils, groundwater, and on-site soil investigations at the former CFC facility and the Shiawassee River downstream of the former CFC facility. In 1986 Warzyn, Inc. initiated a Remedial Investigation (RI) of the former CFC facility and the Shiawassee River that culminated in the completion of a MDNR RI Report and Baseline Risk Assessment for the Site in 1992. As part of the RI investigation the Shiawassee River was divided into 61 irregularly spaced sampling transects which extended approximately 40 miles downstream to the Shiawasseetown Reservoir. The RI found total PCB concentrations greater than 10 mg/kg in soils at two locations east and northeast of the former CFC facility building. This investigation further revealed that the highest PCB concentrations in Shiawassee River sediments were within 6,000 feet of the former CFC facility. The 1992 RI data and data obtained by Malcolm Pernie Engineers (MPE) during a 1994 supplemental investigation was used in the development of a 1997 Feasibility Study (FS) completed by MPE under contract to the MDNR.

In 1999, TetraTech EM, Inc., under contract to USEPA Region 5 performed another Remedial Investigation to assess the current extent of PCB contamination in the on-site soils and in the sediments of the Shiawassee River and soils in the floodplains downstream of the former CFC facility. Limited (10 locations) on-site site sampling in areas previously sampled during the MDNR RI detected PCB concentrations of 11 mg/kg to 20 mg/kg in two former lagoon/low-lying areas to the northeast and east of the facility building.

Floodplain soil and river sediment samples were collected by TetraTech at all 61 sampling transects established by Warzyn during the earlier MDNR RI. Results of the TetraTech transect river and floodplain soil sample results are included in Appendix B of the approved RD/RA Work Plan. The maximum reported PCB concentration was 300 mg/kg in river sediment at transect 7 approximately 0.2 miles downstream of the former CFC facility, followed by an isolated detection of 100 mg/kg

PCBs at transect 25 approximately 1.3 miles downstream of the former CFC facility. The remaining PCB concentrations above 5 mg/kg were found at three other transects within the first river mile downstream of the facility. The maximum reported PCB concentration was 99 mg/kg in floodplain soils at transect 9 approximately 0.3 miles downstream of the former CFC facility. The remaining PCB detections at or above a concentration of 10 mg/kg were found at Transects 16, 26, 28, and 37. None of these PCB floodplain transect results exceeded 13 mg/kg within the first river mile downstream of the facility. A fish study was also performed as part of the TetraTech EM, Inc. RI to assess external indications of stress on the river fish. None were noted.

In 2002, ENTACT undertook the PDI to further define the lateral and vertical extent of soil and sediment contamination at the site. This effort focused on areas previously identified by the RI, but also included sediment sampling along supplemental transects placed in the first river mile downstream of the CFC facility. The PDI resulted in the identification and delineation of four river sediments locations, three river floodplain locations, and two locations on the former CFC facility property, where PCB concentrations exceed the 5 and 10 mg/kg RALs for river sediments and for floodplain/facility soils, respectively.

The results of PDI were documented in a PDI Report prepared by ENTACT, dated August 2003. The PDI was accepted by USEPA in April 2004.

# 1.3.3 Regulatory Enforcement Actions

In 1974, routine stream sediment sampling performed by the MDNR detected PCBs in the sediments of the Shiawassee River downstream of the CFC facility (MPE 1997). In 1975, the MDNR identified the CFC facility as a source of PCB contamination in the River and subsequently the Michigan Water Resources Commission requested that CFC flush all PCBs from their plant equipment. This task was reportedly completed in 1976. Also during the 1974 to 1977 period CFC modified their waste water system to eliminate the use of the settling tank by replacing it with a lined synthetic lagoon with an overflow discharge pipe to the wetlands area east of the facility buildings.

In 1977, the MDNR found that CFC was discharging its process wastewater from the lined lagoon to an area north of the location where the previously mentioned unlined lagoon was located. The MDNR directed CFC to stop the discharge and CFC subsequently modified their wastewater system to include an overflow lagoon connected to the lined lagoon by an unlined ditch. In June of that year, the State of Michigan filed suit against CFC for PCB contamination of the environment. The case against CFC was settled through a Consent Judgment in June 1981. Under that judgment, CFC further modified their wastewater system by rerouting stormwater runoff, removing the lined lagoon, performed on-site soil remediation on their property and at the facilities river discharge point and contributed money for the future restoration of the affected Shiawassee River up to eight miles downstream of the Facility. The MDNR performed several fish and sediment sampling investigations shortly after the issuance of the Consent judgment along the Shiawassee River and found PCBs in river fish tissue and the sediments at sufficient concentrations to warrant the Livingston County Health Department to issue warnings against the human consumption of fish along the river.

In 1982, A-1 Disposal, under contract to the MDNR and using the monies obtained through the Consent Judgment, performed discrete remedial dredging operations in the first 1.5 miles of the river, removing 1,805 cubic yards (cy) of sediment reported to contain approximately 2,531 pounds of PCBs (Warzyn, 1992). An aquatic life bioaccumulation study contracted by MDNR during the remediation found that the dredging activities resulted in the increased bioavailablity of PCB-contaminated sediments in the river during the remediation. In 1998, however, MDEQ performed a caged fish study at the mouth of the Shiawassee River and the total PCB level detected in these caged fish was 0.0346 ppm, which is below the State PCB fish advisory (MDNR 1999). A combined total of 3,235 feet of river sediments were dredged prior to discontinuing activities due to a lack of funding.

In 1983, the Shiawassee River Site was placed on the National Priorities List (NPL) because of the PCBs remaining in the River sediment and floodplain deposits. The United States EPA self-performed several investigations/supplemental investigations of the affected river reach and the former CFC property soils/sediments in 1987, 1994 and 1999-2000 as part of the Remedial Investigation/Feasibility Study process for the Site. The RI/FS work culminated in the *Final Supplemental Feasibility Study Report for Shiawassee River Site*. This document is the basis for the USEPA's selected remedy identified in the USEPA's Record of Decision (ROD) for the Shiawassee River Site issued in the spring of 2002.

# 1.3.4 Summary of Selected Remedy

On April 29, 2002, The USEPA issued the Administrative Order on Consent (AOC) pursuant to Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (Docket No. V-W-'02-C-691) for the Shiawassee River Site. The AOC directed the identified respondents to implement the ROD with the selected remedy: Alternative 3b – Excavation and Off-Site Disposal of Contaminated Soils and Sediments in Landfills, using a Remedial Action Level (RAL) of 5 mg/kg total PCBs for river sediment, and a RAL of 10 mg/kg total PCBs for floodplain soils, i.e., removal within the first mile and the specified reaches beyond the first mile of any sediment determined by the sampling to contain PCB concentrations in excess of 5 ppm. In addition, the ROD included a post-remediation Surface Weighted Average Concentration (SWAC) goal of 1 mg/kg for the first five miles down stream of the former CFC facility. The long-term remediation goal is the attainment of a SWAC PRG of 0.2 mg/kg in the affected river sediments. A post-RA long-term SWAC monitoring program will be used to assess the actual effectiveness of the remedy on conclusion of remedial field activities.

The selected remedy, as specified in the ROD and UAO, possessed the following major remedial action components:

Remove and properly dispose of approximately 1,590 cubic yards of off-site sediment from the Shiawassee River in five identified river sediment PCB localized "hotspot" (exceeding the calculated RA criterion) locations at Site River transects 4, 7, 11, 12 and 25. The transect 25 hotspot is approximately 1.3 miles downstream of the former CFC facility and the only sediment hotspot beyond the first river mile downstream of the facility. Excavated sediments will be staged in a containment area, dewatered and transported to the appropriate hazardous/non-hazardous disposal facility based on the excavated sediment's "as found" concentration.

- 2) Remove and properly dispose of approximately 1,775 cubic yards of off-site soil from the Shiawassee River floodplain predominantly located from the east floodplain near River Transect 9. Excavated floodplain soils will be staged in a containment area, dewatered as necessary and transported to the appropriate hazardous/non-hazardous disposal facility based on the excavated soil's "as found" concentration.
- Remove and properly dispose of approximately 795 cubic yards of on-site soil from isolated lowland areas to the northeast and east of the former CFC former facility building. Excavated on-site soils will be staged in a containment area, dewatered as necessary and transported to the appropriate hazardous/non-hazardous disposal facility based on the excavated soil's "as found" concentration.
- As part of the Part of the SOW, perform a pre-design investigation of the sediments along the first river mile of the facility to further delineate the extent of PCBs in sediments.
- 5) Implement institutional and if required engineering controls at On-Site areas where post-remediation levels exceed safe limits appropriate to an industrial land use.
- 6) Perform restoration activities after completion of remedial activities.

As indicated, the PDI has been completed and submitted. Changes in the scope of the selected remedy resulting from the finding of the PDI include a significant reduction in the total volume of soils and sediments that exceed RALs form those volumes specified above. In addition, revised SWAC calculations based upon the PDI data suggest that the post-remediation goal may be met without removing all river sediments exceeding the 5 mg/kg RAL. Therefore, if all materials exceeding RALs cannot be removed due to access or other logistical issues, post-removal sampling data will be re-assessed through a final post-remedial SWAC calculation to ensure that the post-remedial goal has been achieved. The specific changes in the scope of work are addressed within Section 4 of this design document.

#### 1.4 PROPERTY OWNERSHIP

Several private parties own property along the affected sections of the Shiawassee River west of and/or downstream of the property currently under the ownership of Hayes Lemmerz. Individual parcels along that section of the River from the former CFC facility to Transect 26 are depicted in Figure 3. A summary of property owner information is included in Table C-1 of the Site Access Plan. In addition to Hayes Lemmerz, those property owners whose lands will or may be affected by the remedial action described herein, including gaining access to work areas, are listed on the following page.

Access agreements for the proposed remedial activities will be secured with Hayes Lemmerz and these other property owners prior to implementation of the remedial action.

Cross- Reference Number	Property Address	Owner	Owner Address	Potential Impact
1	2800 West Highland Rd. Howell, Mi. 48843	David/Judith Rhode	2800 West Highland Rd. Howell, Mi. 48843	Alternative access to Transects 4, 7, and 9
2	2204 Tooley Rd. Howell, Mi. 48843	William/Pamela Altemus	2500 Popple Lane Howell, Mi. 48843	Alternate access route to Supplemental Transect S12-08
6	2625 Bowen Rd. Howell, Mi. 48843	Doug/Salley Heinze	195 East Highland Rd. Howell Mi 48843	Work at and alternative access to Supplemental Transect S21-03
8	2647 Bowen Rd. Howell, Mi. 48843-8752	Clyde/Gladys Waters	2647 Bowen Rd. Howell, Mi. 48843-8752	Work at and access to Supplemental Transect S21-03
11 <sup>(</sup>	2755 Tooley Rd. Howell, Mi. 48843	Rich Vangilder	1101 Smith Fowlerville, Mi. 48836	Work at and access to Transect 26.
13 <sup>]</sup>	2630 Bowen Rd. Howell, Mi. 48843-8752	Tom/Michele Bahl	2630 Bowen Rd. Howell, Mi. 48843-8752	Alternative access to Transect 26
16	4083 Byron Rd. Howell, MI 48855	Thomas O'Connell	1009 South Pickney Rd. Howell, MI 48843	Work at Transect 37
NA	3900 Indian Camp Trail, Howell, Mi. 48855	Jim Roman	3900 Indian Camp Trail, Howell, Mi. 48855	Access to Transect 37

#### 2.0 PROJECT ORGANIZATION

Figure 4 illustrates the organizational structure and lines of authority of key management, quality assurance and operational personnel overseeing and implementing the required removal activities at the Shiawassee River Site. Although not anticipated, ENTACT's assigned management team may change during implementation of the RA. If there is a change in personnel of ENTACT's management team, the modification will be communicated to US EPA's RPM by the Project Coordinator. The responsibilities of each team member are identified in the following sections.

#### 2.1 MANAGEMENT RESPONSIBILITIES

The following personnel will oversee and/or manage the execution of the RD/RA at the Shiawassee River Site:

- USEPA CERCLA Remedial Project Manager, Thomas G. Williams, USEPA Region 5 The USEPA CERCLA Remedial Project Manager (RPM) has overall oversight and guidance responsibility for all phases of the Remedial Action Workplan. Specific responsibilities of the RPM are defined in the RD/RA QAPP.
- Michigan Department of Environmental Quality (MDEQ) Project Manager, Sunny Krajcovic The MDEQ Project Manager provides project oversight as a representative of the State and its citizens. Specific responsibilities of the MDEQ project manager are defined in the RD/RA QAPP.
- Project Coordinator/Engineer, Christopher Preston, P.E., ENTACT
  The Project Coordinator's prime responsibilities are to ensure proper coordination among various project stakeholders. These stakeholders include the USEPA, MDEQ, and the identified AO Respondents. The ENTACT project coordinator is the overall point of contact for the RPM and Respondents. Specific responsibilities of the project coordinator are defined in the RD/RA QAPP.

The project coordinator will also have overall responsibility for ensuring that the defined remedial activities are implemented and completed in accordance with the AOC, revised Statement of Work, the U.S. EPA-approved RD/RA Workplan and federal, state, and local regulations. Specific responsibilities of the Technical Project Manager are defined in the RD/RA QAPP.

Technical Project Manager/QA Manager, Jeffrey A Stofferahn., ENTACT
The ENTACT Technical Project Manager is responsible for providing regulatory and technical support to the ENTACT Project Team to ensure that the site activities are implemented and completed in accordance with the AOC, SOW, the U.S. EPA-approved RA Work Plan and federal, state, and local regulations. The Technical Project Manager will also oversee and coordinate Quality Assurance personnel and provide technical support to the Field Manager in the areas of wastewater management and treatment, solid and hazardous waste management, soil and sediment sampling, wetlands and/or wetland restoration issues and any other technical design requirements for the RA. The ENTACT Technical Project Manager is the point of contact for the RPM and Respondents for any technical or regulatory issues that may arise throughout the RD/RA process. Specific responsibilities of the Technical Project Manager are defined in the RD/RA QAPP.

#### Corporate Health and Safety Director. Donald Self, ENTACT

The ENTACT Corporate Health and Safety Officer will coordinate and provide oversight for Health and Safety related issues at the site. He will be responsible for conducting the Health and Safety Orientation meeting before the RA is implemented. He will review weekly health and safety updates from the Site and conduct routine audits/inspections at the site during the RA to ensure that on-site field practices are safe and meet OSHA requirements. Specific responsibilities of the Corporate Health and Safety Director are defined in the RD/RA QAPP.

#### 2.2 QUALITY ASSURANCE RESPONSIBILITIES

The following personnel will be involved in Quality Assurance activities of the RD/RA at the Shiawassee River Site:

- USEPA CERCLA Field Services Section Chemist, Richard Byvik, USEPA Region 5 The USEPA CERCLA Field Services Section Chemist (RPM) will be responsible for review and approval of the project QAPP.
- QA Manager, Jeffrey A. Stofferahn, ENTACT The ENTACT QA Manager (RPM) will be responsible for ensuring that the approved QAPP is implemented during field activities. Specific responsibilities of the QA Manager are defined in the OAPP.
- On-Site QA/QC Officer, ENTACT

The on-site QA/QC officer will be responsible for performing required quality control testing at the site. The on-site Quality Control Officer will operate independently of ENTACT's Field Project Manager. The QA/QC Officer will communicate any QA/QC issues related to the site to the QA Manager. Under approval by the QA manager, The QA/QC officer will have the authority to correct and implement additional measures to assure compliance with the approved workplan, including the QAPP. Specific responsibilities of the On-Site QA/QC Officer are defined in the QAPP.

Data Validator, Marcia Kuehl, MA Kuehl Co., LLC.

The data validator will perform and internal review of the QAPP prior to submittal to the Agency. The data validator will be responsible for a 10 percent validation of the confirmatory analytical data packages generated as part of the RD/RA.

Analytical Laboratory Staff, Great Lakes Analytical

The Great Lakes Analytical Project Manager will report directly to the ENTACT QC Manager and will be responsible for ensuring that all resources of the laboratory are available on an as required basis. The laboratory project manager is also responsible for identifying any problems or questions regarding samples and associated Chain of custody form submitted from the project, communicating QA/QC issues identified by the laboratory QA manager, implementing laboratory corrective actions, ensuring that specified turn-around times are met, and that sample reports and data validation packages are submitted to ENTACT on a timely basis. Specific responsibilities of the Project analytical laboratory personnel are defined in the QAPP.

#### 2.3 FIELD OPERATIONS RESPONSIBILITIES

The following personnel will act as the ENTACT on-site management team throughout the duration of the RD/RA at the Shiawassee River Site:

#### Field Project Manager, Robert Ainslie, ENTACT

The on-site Field Project Manager (FPM) is responsible for the proper and timely execution of the remedial action in accordance with the Site-Specific Project Documents. The FPM is responsible for all personnel on-site and the overall operation of project task execution. The FPM reports to the Project coordinator and is supported by the Technical project manager. He will also assist the Site Safety officer in ensuring a safe work environment and self-police the activities of his field personnel. Specific responsibilities of the field project manager are defined in the OAPP.

### • Administrative Project Manager, Adam Ewert, ENTACT

The on-site administrative project manager (APM) will work in conjunction with the Field Project Manager in coordinating the execution of the remedial design during the remedial action. He is principally responsible for procurement, invoicing, and tracking project progression. The APM reports to the Project coordinator and is supported by the ENTACT administrative staff. Specific responsibilities of the field administrative project manager are defined in the QAPP.

#### Field QA/QC Officer, ENTACT

The field QA/QC Officer identified in Section 2.2 will also be in the field and will be responsible for overseeing/performing sampling activities, maintaining documentation records, performing Site QA/QC and ensuring that the QAPP is followed during the project duration. The field QA/QC officer will report to the ENTACT QA manager to resolve issues related to the execution of the QAPP, and will support the ENTACT FPM and APM during the execution of the RA. Specific responsibilities of the field QA/QC officer are defined in the QAPP.

#### 3.0 SCOPE OF WORK TASKS

# 3.1 Scope Of Work Task Overview

The RD/RA for the Shiawassee River Site will be implemented in accordance with the five required tasks described in Section III of the SOW. These tasks are as follows:

- TASK 1: RD/RA Work Plan (completed)
- TASK 2: Remedial Design
- TASK 3: Remedial Action Construction
- TASK 4: Reports and Submissions
- TASK 5: Operation and Maintenance

Task 1 has been completed and approved by the U.S.EPA. Each of the remaining identified tasks and its applicable elements and/or supporting plans are described in the following sections.

# 3.2 REMEDIAL DESIGN (TASK 2)

Pre-final and final design documents for the RD/RA will be completed as part of this SOW task. Due to the limited nature of the remedial action and the desire to perform the RA in an expedited manner, it is proposed that no preliminary design be submitted. Remedial Design submittals will include pre-final (Draft) and final (Final) design documents. These documents will include the following Remedial Design elements and required supporting plans:

#### 3.2.1 Pre-Final Design Submittal

The Pre-Final Design submittal will summarize and incorporate the findings from the pre-design investigations into the Project remedial design submittal. The Pre-Final Design will include construction specifications with associated drawings, applied design analysis, project scheduling and capital and O&M costing estimates. The Pre-Final Design will also include the following submittals:

- Draft Construction Quality Assurance Project Plan (CQAPP)
- Draft Operation & Maintenance (O&M) Plan.

The CQAPP will be used to ensure that the RA meets or exceed all design criteria. As with all submitted work documents, any applicable comments and/or deficiencies identified by the USEPA and MDEQ will be incorporated into the Final CQAPP in the Final Design submittal. At a minimum, the CQAPP will include discussion on CQA roles, responsibility, and authority; CQA personnel qualifications; CQA inspection activities scheduling, including pre-construction, pre-certification, and final certification activities; CQA sampling requirements; and CQA documentation.

A Draft O&M Plan will be submitted after approval of the design documents, and prior to mobilization.

# 3.2.2 Final Design Submittal

The Final Design submittal will include final construction specifications with all associated drawings and applied design analysis, final project schedule, and capital and O&M costing estimates, and the reviewed final Construction schedule and CQAPP for the implementation of the RA. ENTACT will not commence removal action activities until the property access has been secured and the USEPA has approved the final CQAPP. The Final Design submittal will also include the Final CQAPP. The Final O&M Plan will be submitted after receipt of comments on the draft O&M Plan.

# 3.3 REMEDIAL ACTION CONSTRUCTION (TASK 3)

In accordance with the Schedule in Section IV of the SOW, the RA will be implemented as described in the final RD/RA Work Plan and RD documents. The general remedial action and construction activities are described in detail in Section 4.0 of this Work Plan.

# 3.4 REMEDIAL ACTION REPORTS AND SUBMISSIONS (TASK 4)

#### 3.4.1 RD/RA Submittals

ENTACT will submit to the USEPA the SOW-required plans, specifications and/or reports as defined in SOW Tasks 1 through 3 and Task 5 (O&M) (Work Plan Sections 3.1 through 3.4, Section 3.5) to document the execution of the RD/RA. However, as discussed with the USEPA prior to the development of the RD/RA no preliminary design submittal will be made in order to expedite RA Action. As the RD is relatively straight forward and of the limited magnitude, elimination of the preliminary design phase will eliminate a submittal and review period. All required information for the preliminary submittal has been incorporated into the Pre-Final Design submittal.

As directed by the USEPA, the MDEQ will have the opportunity to comment on pre-final submittals. ENTACT will incorporate applicable USEPA and MDEQ comments prior to the submittal of the document as "final".

The project schedule provided in Section 5.0 (Figure 5) lists the anticipated project document submittal dates in accordance with the submittal durations specified in Section IV of the SOW.

### 3.4.2 Monthly Project Reporting

A monthly project progress report will be submitted to the USEPA no later than 10 days after the end of the work month to document monthly project activities. At a minimum the monthly report will include the following:

- A description of the actions which have taken place during the month;
- A summary of all results of sampling and tests and all other data received or generated during the month;
- Identification of all documents completed and submitted during the month;
- A description of all actions which are scheduled for the next six weeks; and;

Any work plan modifications proposed/approved.

These monthly progress reports will be submitted to USEPA RPM and to the MDEQ Project Manager no later than 10 days after the end of the month the work was performed. ENTACT will notify USEPA of the occurrence of any change in schedule described in the monthly progress report for the performance of any activity no later than five days prior to performance of the activity. A copy of a monthly update format for the Shiawassee River Site is included in Appendix G of the RD/RA Work Plan.

# 3.5 OPERATION AND MAINTENANCE (TASK 5)

A Draft and a Final O&M Plan will be provided prior to initiation of the RA, following approval of the Design Documents. Under the current RD/RA no engineered barriers or special TSCA placarding will be required to be maintained as part of Site O&M.

The O&M plan will briefly describe the known extent of PCBs in exceedence of the Michigan Industrial/Commercial Land use criterion for PCBs and provide a Site plat map completed by a Licensed Professional Surveyor depicting those areas in exceedence. The O&M Plan will include a copy of the restrictive covenant and list restrictions associated with handling the material. The plan will indicate that prior to any proposed excavation within areas delineated as restricted Site soils, the USEPA and the MDEQ will require prior notification. The plan will provide contact numbers of the Federal and State Project Managers. The O&M Plan will provide TSCA as found concentration sampling, handling and landfill notification requirements that need to be maintained in the event that the MDEQ and USEPA permit the excavation and/or handling of the excavated soils.

The O&M Plan also will provide a long term monitoring plan for river sediments to assess the long-term effectiveness of the remedy on completion of remedial activities described in this Work Plan. The long-term monitoring plan will be based on the SWAC method of determining when a given river segment has met overall long term-project PRGs.

# 4.0 REMEDIAL ACTION

# 4.1 REMEDIAL ACTION SCHEDULE

The RA project schedule is provided as Figure 5. The schedule includes an estimated schedule of completion for each required major activity and submission of each major deliverable.

### 4.2 PERMITTING AND ACCESS

MDEQ will require the submittal of Substantive Requirements Documents (SRDs) pursuant to the proposed surface water discharge and sediment removal activities associated with the RA activities outlined herein. Review and approval of these documents may take up to 90-days, therefore they will be submitted to the MDEQ upon receipt of notification to proceed.

As indicated in Subsection 1.4, several individual property owners in addition to Hayes Lemmerz own property that will or may be affected by the remedial action, including gaining access to work areas. Pursuant to the Site Access Plan presented as Appendix C to the RD/RA Work Plan, access agreements for remedial activities will be secured from each of these owners prior to mobilization.

### 4.3 PRE-CONSTRUCTION INSPECTION AND MEETING

Site representatives and ENTACT will meet with USEPA and MDEQ representatives for a preconstruction inspection and meeting at the Shiawassee River Site. The purpose of the meeting will be to:

- Provide an overview of Site conditions, and the scope of work:
- Review methods for documenting and reporting inspection data;
- Review methods for distributing and storing documents and reports;
- Review work area security and safety protocols;
- Discuss any restrictions/conditions regarding access to private properties along the Shiawassee River.
- Discuss any appropriate modifications to project plans to ensure that encountered sitespecific considerations are addressed; and,
- Conduct a site walk to verify that the design criteria, plans, and specifications are understood and to review material and equipment storage locations.

The pre-construction inspection and meeting will be documented by one of the attendees and the transcribed minutes will be transmitted to all parties.

# 4.4 MOBILIZATION AND SITE PREPARATION

Project mobilization and site preparation activities will be conducted to prepare the site for full-scale remediation activities. Achieving a quality project according to schedule requires experienced planning and organization during the mobilization phase of the project. At a minimum, the site preparation activities listed below will be conducted for the Shiawassee River Project:

- Notify appropriate agencies for emergency response in accordance with the Contingency Plan (Section 11.0 of the Health and Safety Plan)
- Notify USACE for impending work within floodplain;
- Notify MissDig to schedule an underground utility locate:
- Verify that all necessary private property access agreements are in place (refer to Subsection 4.2 and Appendix C of the Site Access Plan);
- Verify that all applicable SRDs are in place with MDEQ (refer to Subsection 4.2);
- Contact suppliers and vendors to allow for timely and efficient project start up;
- Obtain the necessary waste profiles and approvals with the designated landfills;
- Perform Site survey and photo-document Site and anticipated haul route and work areas, record the pre-construction condition of the Site areas;
- Locate Site trailers and establish temporary Site utility hookups;
- Construct soil and sediment containment/dewatering area. and requisite access improvements to river and floodplain remediation areas:
- Re-establish GPS base station and Site benchmarks;
- Construct decontamination areas for personnel and equipment;
- Establish work and exclusion zones;
- Establish a 25-foot by 25-foot excavation and sampling grid in the Former CFC facility area remediation area;
- Install storm water controls; and,
- Deliver and install water treatment systems for collection treatment of staged soil pore water, dust suppression, and discharge.

Figure 6 illustrates the general facility layout and the approximate location of the proposed soil staging/dewatering area to the north of the Facility building.

In order to prepare for efficient excavation and material dewatering operations, ENTACT will align numerous aspects of site control, including:

- Establish site inspection protocol and documentation requirements;
- Secure the impacted work areas to control site entry and exit;
- Implement ENTACT's sign-in log to document entry of visitors and personnel on site; and,
- Post the appropriate signage to control and restrict site access.

Work Zones will be established in the various areas of the Site immediately prior to the initiation of excavation work. Due to the remote and isolated nature of the remediation areas relative to the staging area, independent work zones will be established at each excavation area. Tape and signs will be installed to identify the applicable Exclusion, Contamination Reduction, and Decontamination Zones. Presently, Level D Personal Protective Equipment (PPE) will be required to enter the Exclusion Zone. Access to the zones will be controlled.

#### 4.4.1 Subsurface Utilities

Prior to beginning heavy equipment operations, ENTACT will file utility line locate requests with Miss Dig (1-800-482-7171), the Michigan utility location coordinator, for locating services for underground utilities meetings (gas, electric, telephone fiber and wire, storm and sanitary sewer,

water and cable). ENTACT will also contact and interview the facility supervisor and request that ENTACT inspect any as built facility drawings, if available.

Existing overhead power lines that prevent remedial activities will be either relocated or removed. Caution and awareness of power lines that remain in place will be emphasized in site safety meetings (gas, electric, telephone fiber and wire, storm and sanitary sewer, water and cable);

#### 4.4.2 Storm Water Controls

Storm water and erosion control measures will be implemented before the execution of remedial construction activities. Erosion controls are of particular importance given the Remedial Action's proximity to the Shiawassee River and adjacent wetlands and floodplain. As part of pre-design activities, a Sediment and Floodplain/Wetlands Excavation Effects Plan was developed to assess the potential short-term impacts of proposed construction activity. This plan is included as Appendix E of the Final RD/RA Work plan.

Erosion control measures will include locating, to the extent practicable, suitable access roads to the remediation areas above the 100 year flood plain, the construction and use of silt fencing, berms, armoring, hay bales and/or drainage channels to prevent off-site run-off and control overland flow. The measures to be implemented at each work area are discussed within Subsection 4.4 through 4.6, below.

### 4.4.3 Material Staging/Dewatering Area

A lined and bermed excavation soil staging and dewatering area will be constructed in a designated area of the site to the north of the former CFC building. The staging/dewatering area will be constructed to facilitate the controlled gravity draining and drying of excavated saturated material from the various RA areas, and designed to prevent any release of the drainage water into the environment. Water from the impacted soil will be collected in a sump and treated onsite prior to discharge back to the Shiawassee River (refer to Subsection 4.9).

The containment area will be divided into two dewatering cells. One cell will be used to dewater those saturated soils and sediments having an as found (in situ) total PCB concentration less than 50 mg/kg, and the other cell will be used to dewater those saturated soils and sediments having an inplace total PCB concentration less than 50 mg/kg.

Based upon results of the PDI, the lateral extent of the remediation areas excavated have been estimated by assuming all soils and sediments will be removed up to the nearest sample locations where soils did not exceed the RAL. During the PDI, the identification of specific areas with total PCBs greater than 50 mg/kg was based upon the results of mobile on-site laboratory results that in all but one instance were not confirmed by fixed-facility laboratory analytical results. Therefore, during the excavation of those remediation areas where in-place PCB concentrations exceed 50 mg/kg, soils and sediments removed from the outer extent of the remediation area (greater than one half the distance from any interior sample where PCB concentrations exceeded 50 mg/kg to the edge of the area) will be staged, loaded, hauled separately from those soils/sediments removed from the inner extent of the remediation area. These "outer" soils and sediments will be staged in the cell designated for <50 mg/kg PCB material. Prior to off-site disposal of the "outer" soils, samples will

be collected from the soil stockpile, as described in the FASP, to verify that the soils are below 50 ppm and suitable for disposal at a non-TSCA landfill.

The estimated volume of material to be de-watered is 460 cubic yards (yd³). 435 yd³ of soil/sediments are located in areas where at least one in-situ PCB concentrations greater than 50 mg/kg. It is currently estimated that roughly 50 percent of this volume, or 215 yd³, will be removed from the inner portion of these remediation areas and will be staged in the cell designated for >50 mg/kg PCB material.

Approximately 25 yd<sup>3</sup> of soil/sediment are located within one remediation area where as-found PCB concentrations were less than 50 mg/kg. Along with approximately 220 yd<sup>3</sup> of material from the outer extent of the aforementioned remediation area, an estimated 245 yd<sup>3</sup> of soils and sediments will be staged in the cell designated for <50 mg/kg PCB material.

The dimensions of each cell and square footage of the floor of the staging/dewatering cells are summarized below.

«Cell	Total Volume: (yd.)	Volume	Assumed Average, Depth of Staged Still (fi):	Area Govered by Staged Soil Surf (vol/depth) (ft x ift)	C Floor Area of Gell (fi x fi)
<50 mg/kg PCB	245	6,615	3	47 by 47	50 x 50
>50 mg/kg PCB	215	5,805	3	44 by 44	50 x 50

<sup>\* -</sup> Estimated volumes rounded to nearest 5 yards and include a 25% contingency over initially estimated bank volumes.

The floor of the dewatering cells will be lined and graded to drain soil pore water to a collection sump. A pump will transfer the water to the water treatment system. Construction of this dewatering area will consist of the following activities:

- Clear and grub the containment footprint area square foot area;
- Grade area to achieve positive slope to a sump;
- Construct a perimeter soil berm; and
- Install a 60 mil HDPE liner on the floor and interior sidewalls of the berm.

The proposed location of the soil staging/dewatering area is depicted in Figure 6.

### 4.4.4 Water Treatment System

During mobilization, a water treatment system will be constructed. This treatment system will be utilized to treat water generated from the dewatering of excavated soils and sediments, as well as from the de-watering of one of the work areas (refer to Subsection 4.4). This treatment system is described in detail in Subsection 4.8. A schematic of the system is shown in Figure 7.

# 4.4.5 Fugitive Emissions Controls

It is anticipated that the bulk of the material excavated as part of the RA will be relatively saturated and not likely to emit significant particulate emissions. However, exposure of soil within the work areas and the potential use of drying agent on the excavated sediments may increase the potential for fugitive particulate emissions during work execution. Site preparations to mitigate dust emissions will include positioning and implementing dust suppression and engineering control measures to ensure that air emissions are maintained at "no visible emissions" at the Site boundary/fence line during the construction phase of the RA. To control dust, ENTACT will employ misting using high-pressure, low-volume, portable water spray units in dry excavation areas, in the soil staging areas during the addition of soil drying agents, and on access roads as necessary.

Real time monitoring air particulate monitoring will be performed during the execution construction activities during the RA to assess any work zone fugitive particulate emissions. A hand held random air monitor (miniRAM) will be utilized to measure particulate matter continuously throughout the work period each day in and around the work zone. If miniRAM monitoring indicates levels greater than 0.150 mg/m³, construction activities may be suspended while dust suppression measures are increased and/or additional dust suppression controls are implemented. The additional dust suppression measures or controls will be continued until the average miniRAM readings are consistently less than 0.150 mg/m³. Dust suppression measures will be downgraded to the previous level upon achievement of this criterion.

# 4.4.6 Site Security

Access to the on-facility work areas will be physically controlled by the existing Hayes Lemmerz property perimeter fence and gates. The ENTACT FPM will control visitor and contractor access to work areas. Site visitors entering the Site will be required to go directly to the on-Site field office and the FPM to determine their access status/business at the Site. All visitors will be required to sign in and sign out of the visitor logbook, located inside the ENTACT administrative office trailer.

Vendors, unless escorted by project personnel will not be allowed on-site. Those visitors permitted by direct affiliation or contract to ENTACT, USEPA or MDEQ and wishing to visit on or off site work areas must read, sign and comply with the HASP and must wear the appropriate personal protective equipment before entering work areas. If the qualified visitor wishes to visit an off-site work area, the visitor must contact the FPM first. If the FPM is not at the off-site area, the FPM will contact the lead operator or QA/QC officer at the off-site location and notify them of the impending visit and the visitor's access privileges.

All visitors wishing to enter any exclusion zone must have the necessary documentation on file at the Site as specified in the Site-Specific HASP.

Because the former CFC facility is an active industrial operation, ENTACT will designate a traffic coordinator to manage the movement of vehicles and equipment. This coordinator will have real-time communications capabilities with designated Hayes-Lemmerz personnel (i.e., two-way radios), to allow for the coordinated movement of traffic.

Temporary fencing will be installed around on-site work zones and the soil staging area. The fence will be placarded with signs at regular intervals, warning of the presence of potentially hazardous materials. In remote off-site areas, hazard tape or banner flagging will be used to demarcate the work zones.

Temporary fencing and signage will be utilized to restrict access to specific off-facility work locations along the Shiawassee River.

# 4.4.7 Establishment of Transects and Coordinate System

A Trimble Global Positioning System (GPS) unit and base station will be used for surveying removal areas and confirmatory sample locations during the RA activities. In those areas where the tree canopy or adjacent structures prevent the use of GPS, a Total Station surveying instrument will be used.

# 4.5 FORMER CAST FORGE FACILITY SOIL AND SEDIMENT REMOVAL

The USEPA Supplemental FS sampling identified two low-lying/wetland areas to the east-northeast of the former CFC building where total PCB concentrations ranged from 11 to 20 mg/kg up to a depth of two feet below grade. PDI results have confirmed the presence of PCBs ranging from 110 to 610 mg/kg up to a depth of two feet below grade. The delineated areas are illustrated in Figure 8.

The northern-most affected area is located in a low, marshy area east of the existing facility building. The southern-most affected area is located within a narrow, low-lying ditch located immediately east of the driveway bordering the existing facility building. The ditch receives storm water run-off via a metal culvert from a low, marshy area immediately to the north; the culvert extends through a raised berm that separates the ditch from the marshy area. The ditch also receives overland storm water run-off from the driveway areas near the facility building. Much of the affected portion of this ditch has standing water throughout the year. The ditch extends to the southeast as a somewhat less-defined channel beyond a fence that demarcates the current property boundary of the facility. Results from the RI and the PDI identified areas in this ditch where PCBs exceed the RAL; all of these are located on the former CFC facility property. The total depth of affected soils is estimated to be two feet below existing grades. Sediments and soils exceeding the RAL will be removed from these areas to the extent feasible, as dictated by the physical and institutional constraints that exist at the site. The extent of remedial efforts will be balanced with the potential impacts to the surrounding river and riparian habitats.

The area, depth, and total volume of affected sediments at each work area are summarized on the following page.

Prior to intrusive activities, ENTACT will photodocument and survey the areas identified for remedial action to document pre-excavation flora and ground surface elevations. ENTACT will then construct erosion controls along the delineated perimeters of each affected area to divert run-on and control run-off from the work areas and minimize any potential harm to the environment during excavation activities.

Work Area	Area (square feet)	Depth (feet)	Volume (cubic feet)	Volume (cubic yards)	Volume with 25% Contingency (cubic yards)	Do Any Sediments Potentially Exceed 50 mg/kg total PCBs?
Northern Area	334	1	334	12.4	15.5	Yes
Ditch	1905	2	3810	141.1	176.4	Yes
SUBTOTAL			4144	153.5	191.9	·

Within the northern-most area, the affected soils within the work zone will be removed using conventional excavation methods. Equipment that will be in this work area has been selected to minimize impacts to the wetlands habitat in which this area is located. A small rubber-tired trackhoe (e.g., John Deere 4310 tractor with front end loader and backhoe excavator attachments, or equivalent) will be used to excavate the affected soil. Plywood sheeting will be utilized as necessary to minimize impacts to soft soils. The excavated soil will be placed into a lined rubber-wheeled dump-trailer, which will be hauled from the work area to the dewatering/staging area utilizing a second rubber wheeled tractor. Fugitive dust emissions during excavation will be controlled using water misting. Upon completion of excavation to the delineated depth, the excavation floor will be sampled by establishing a 25- by 25-foot grid system within the excavation area. A post-excavation grab sample will be collected from the center of each grid floor, and sidewall samples will be collected at a rate of one per 50 lineal feet of excavation sidewalls that are greater than 18 inches in height. The sampling methodology, sample parameters and analytical methods are described in detail in the Field Sampling & Analysis Plan, Appendix D of the Final RD/RA Work Plan.

Within the southern area, the ditch will be hydraulically isolated by temporarily plugging the inlet of the culvert located on its northern end, and placing a soil berm along the southern edge near the existing fence line. Silt fencing will be placed in the ditch along the down gradient side of the berm to prevent downstream transport of any sediment-laden storm water. If water that collects in the low lying wetland area north of the culvert threatens to flood the adjacent roadway or breach the existing berm separating it from the ditch, it will be diverted using pumps and discharged to the ditch south (down stream) of the earthen isolation berm.

Water within the affected portion of the ditch will be pumped to the water treatment system. Once the ditch is dewatered, the affected soils and sediments will be removed using conventional excavation methods. A trackhoe with sufficient reach to complete excavation without tracking through other affected portions of the ditch, will be used. The excavator will be staged on plywood sheeting placed on clean soils at the western edge of the ditch. The more up-gradient portions of the affected areas will be excavated first, and may be backfilled after post-excavation sampling to allow access as needed to the lower-lying portions of the ditch.

After post-excavation sampling has been completed, the northern excavated area will be backfilled to the pre-excavation surveyed grade with clean topsoil material. Due to the limited lateral extent of

this excavation, this backfilled area will be allowed to re-seed naturally from the surrounding indigenous vegetation.

The normally submerged ditch sediments do not, for the most part, support macrophyte vegetation, however portions of the excavation area that lie above the normal high water line do support woodland vegetation. The excavated areas below the normal high water line will not be backfilled, rather they will be allowed to fill in passively through natural siltation. The excavated areas above the high water line will be backfilled with clean backfill to the pre-excavation surveyed grade. The top one foot of backfill will consist of clean topsoil. Un-treated wood timbers may be placed along the down-gradient edge of the backfilled area to prevent washout of the soil into the ditch. Each former excavation site will be photo-documented on completion of restoration activities. Due to the limited lateral extent of this excavation, this backfilled area will be allowed to re-seed naturally from the surrounding indigenous vegetation.

### 4.6 SHIAWASSEE RIVER SEDIMENT REMOVAL

Gradient has reported that the mean PCB concentration in the floodplain soil was 0.78 ppm on the west side of the river, and 1.0 ppm on the east side of the river, based upon the 1999 data (Gradient 2001). The SOW-identified five Shiawassee River sediment sample transects (transects 4, 7, 11, 12, and 25) requiring remediation because shallow sediments at these transects have been found to contain total PCBs above the 5.0 mg/kg RAL for river sediments. The USEPA estimated that approximately 1,590 cubic yards of River sediment will need to be removed from these transect areas to meet the Site river sediment RAL.

Results of the PDI have confirmed the presence of sediments exceeding the river sediment RAL at four specific locations, at river Transects 4 and 7, and two supplemental sampling transects, S12-08 (located between transects 9 and 10), and S21-03 (located between transects 19 and 20). These areas are depicted in Figures 8 through 11). Furthermore, PDI results have confirmed the lack of sediments exceeding the RAL remaining at sampling transects 11, 12, and 25. Sediments exceeding the RAL will be removed from these transects to the extent feasible, as dictated by the physical and institutional constraints that exist at the site. The extent of remedial efforts will be balanced with the potential impacts to the surrounding river and riparian habitats.

The mean concentration for the floodplain soils on the west and east sides of the river will be recalculated using the 1999 sampling data, 2003 re-sampling data, and residual concentration data measured after the remedial action is implemented.

The SWAC of PCBs in river sediment will be recalculated based on the 1999 data (for sediment that was not resampled), the 2003 data (for the areas where the 2003 data found no exceedences), and the post-remediation data. It should be noted that this initial SWAC calculation is likely to result in a concentration that is higher than the actual surface weighted average concentration because it is calculated using PCB sediment concentration in reaches 2, 3, 4, and 5 that were measured in 1999 and the actual concentrations are likely to have decreased since that time. The preliminary SWAC PCB concentration will be compared to the long-term PRG of 0.2 ppm to assess the relationship between the current SWAC PCB concentration and the long-term PRG.

The affected sediments at Transects 4 and 7 are located east of the river centerline. Affected sediments at supplemental transects \$12-08 and \$21-03 are located west of the river centerline. The area and depth and total volume of affected sediments at each work area are summarized on the following page.

Transects 4, 7 and S12-08 will be accessed by overland travel directly from the former CFC facility. Some grubbing and clearing of saplings may be required to fully access these locations. Other trail improvements, such as laying gravel in localized wet/low areas, may also be required. The work areas at Transects 4 and 7 are located on the east side of the river, and will be directly accessible via this route.

* Work Area	Area (square -feet)	Depth (feet)	Volume (cubic feet)		Volume with 25% Contingency ( (Fibic yards) 2-	Potentially Exceed
Transect 4	310	1	310	11.5	14.4	Yes
Transect 7	190	2	380	14.1	17.6	Yes
Supplemental Transect S12-08	156	1	156	5.8	7.2	Yes
Supplemental Transect S21-03	172	3	516	19.1	23.9	No
SUBTOTAL			1362	50.4	63.1	39.2 yd <sup>3</sup> > 50 mg/kg PCB

The work area at Transect S12-08 is located on the west side of the river. A temporary ford crossing will be constructed at a location determined in the field to access this work area. Prior to intrusive work, silt fencing will be installed along the rivers edge. At many locations along the river, the riverbank drops from the adjacent floodplain to the riverbed quite abruptly, up to roughly 4 feet. If the riverbank at the selected location requires it, a ramp will initially be cut into the east bank of the river, using the tractor. The ramp will be lined with cleated plywood sheeting to protect underlying soil and prevent soil loss to the river. The ford crossing will consist of 8 by 8 inch wooden timbers of sufficient length to span the riverbed, lashed together with chain. The timbers will be placed using the tractor, and anchored to the bank with additional chain. In lieu of a timber crossing, a temporary bridge constructed of culverts and clean gravel may be employed. Once placed, additional silt fencing will be placed on the opposite bank. The tractor will be utilized to create a similar bank cut on the opposite of the river to allow access to the floodplain. This ramp will also be lined with cleated plywood sheeting.

The location selected for the crossing will be one with minimal bank elevation, as well as a low and consistent water level across the riverbed. If a suitable ford crossing cannot be located, access to this work area may be gained through the Altemus property. Machinery will be transported over-

the-road to the southern terminus of Popple Lane, off-loaded, and driven to the work area. The distance from the terminus of Popple Lane to the work area is approximately 660 feet. Grubbing and clearing of saplings, and some trail improvements may have to be made to fully access this work area via this alternative route.

The work area at Transect S21-03 is located on the west side of the river. This work area will be accessed through the Waters Property. Machinery will be transported over-the-road on trailers to the Waters drive, off-loaded, and driven to the work area. There is a small section of densely overgrown land between the lawn which surrounds the Waters' residence and the work area. Grubbing and clearing of shrub and sapling growth, and possibly other trail improvements will have to be made along an approximate 50 foot pathway through this overgrown area to access this work area. In addition, there are several large trees which are located on the west bank of the river at or near this location; one or more may require felling to gain access. Note that the only alternative access to this work area is from Bowen Road through a thin strip of similarly overgrown land between the river and wetlands immediately to the west; this access would require extensive clearing, grubbing, removal of large trees, and trail improvements.

To excavate these areas, ENTACT will erect temporary levees around the delineated sediments, pump out the water within the levee and remove the exposed sediments exceeding the RALs. Temporary reinforced steel "PortaDams®" are proposed for use during this task (Appendix C). A bag filter system will be used on the discharge line when water levels drop to below one foot above the streambed. It is anticipated that the construction of temporary levees will significantly reduce the potential amount of river sediment re-suspension typically seen during conventional "wet" dredging techniques. This method, however, is only readily implementable with minimal short-term impacts, during low flow periods.

The configuration of the temporary reinforced steel sectional PortaDam® levees will be determined based on the extent of delineated contaminated sediment toward the centerline of the River. In areas where the contaminated sediments do not extend beyond the river centerline, the PortaDam® sections will be placed in a cofferdam configuration. The riverbank opposite the cofferdam will be temporarily armored to prevent scour as a result of increased stream velocities. Water within the coffer-dammed area will be slowly pumped out and discharged downstream. During dewatering of the cofferdam area, shallow water (less than one foot in depth) will be pumped through particulate/bag filters prior to downstream discharge to minimize any release of suspended sediments present immediately above the riverbed.

In the event that a larger area of the riverbank will need to be isolated, temporary levees may be placed across the river upstream and downstream of the contaminated sediments. A gravity flume, constructed of one 32" and one 24" to 32" standard dimensional ratio (SDR), high density polyethylene (HDPE) pipe will be positioned on the edge of the river to divert flow between the upstream and downstream. The flume piping has been sized to readily handle the reported late summer flows of 15 cubic feet per second (cfs) with a peak discharge (factor of safety) of up to 30 cfs. Also, a large high capacity centrifugal pump will be staged on-site to assist bypass flow in the unlikely event of stream flows greater than 30 cfs. The outfall of the flume will be armored with riprap to diffuse flume outlet flow velocities. Construction of the levees and bypass flume will take

approximately two to three days per move. It is anticipated that the maximum design distance of the flume can be no greater than 500 feet.

Again, equipment has been selected to minimize impacts to the riparian habitat adjacent to where the work areas are located, and along access routes into and out of the work areas. A small rubber-tired tractor with backhoe and front loader attachments will be utilized to prepare the adjacent riverbank for access, and to excavate the affected sediments. At some work areas, the riverbank drops from the adjacent floodplain to the riverbed quite abruptly, up to roughly 4 feet. Because small excavation equipment has been selected, access to the river at such points will be made by making a cut into the riverbank to form an earthen ramp from the floodplain to the riverbed. Silt fencing will be placed at the bottom of the bank prior to cutting the ramp. The tractor will be used to excavate the floodplain soils, which will be staged at a location near, but away from the river bank/work location. Once the ramp is cut, cleated plywood sheeting will be used to assist the tractor, as necessary, in accessing the isolated section of the riverbed.

The excavated material will be loaded directly into a lined dump trailer. A second rubber wheeled tractor will be used to haul the dump trailer either directly to the central staging/dewatering area, or to a location where the trailer will be transferred to an over-the-road vehicle (e.g., pick up truck), and hauled over public roads to the former CFC Facility and the central staging area. Because the dump trailers that will be utilized for hauling the affected sediments will have a capacity of roughly 4 ½ to 6 cubic yards, it is anticipated that no more than 4 to 5 trips will be required at any given work area to haul the excavated sediment to the central work area. Multiple dump trailers may be used and temporarily staged at the work area to accommodate the excavation rate, otherwise, temporary staging of the excavated sediments adjacent to the work area is not anticipated.

Upon completion of excavation to the delineated depth, the excavation floor will be sampled by establishing a 25- by 25-foot grid system within the excavation area. A post-excavation sample will be collected in the center of each grid. If the remedial excavation area is less than 25- by 25-foot, one post-excavation sample will be collected in the center of the excavation. These proposed sampling methodologies will provide a representative result for each excavation grid. Post-excavation samples will be submitted to a fixed laboratory for total PCB analysis (SW-846 Method 8081) (dry weight) with a confirmational level Data Quality Objective (DQO) in accordance with the approved Final QAPP.

On completion of post-excavation sample collection, water will be allowed to slowly fill the isolated area. The excavated river sediment area will not be backfilled, unless it is determined that backfilling is required to maintain the integrity of the adjacent bank. In such instances, enough of the excavation will be backfilled with clean sand and/or gravel from a local aggregate source to provide bank support. The cut in the adjacent riverbank will be backfilled to original grade. Because re-creating the steep drop in the riverbank is not considered practical simply by backfilling, commercially available, non-treated wooden timbers may be used to assist in re-establishing the original floodplain grade, and prevent loss of the backfilled soil into the river. These timbers will be left in place after backfilling. Due to the limited lateral extent of this excavation, this backfilled area will be allowed to re-seed naturally from the surrounding indigenous vegetation.

# 4.7 SHIAWASSEE FLOODPLAIN SOIL REMOVAL

The SOW identified five Shiawassee River floodplain sample transects (Transects 9, 16, 26, 28 and 37) requiring further investigation and remediation because floodplain soils at these transects have been found to contain total PCBs above the 10.0 mg/kg RAL for floodplain soils.

The PDI verified the existence of floodplain soils exceeding this RAL at three floodplain locations, Transects 9, 26, and 37. These areas are depicted in Figures 10, 12 and 13. At Transect 9, soils exceeding the RAL ranged from 56 to 78 mg/kg total PCBs at two distinct locations, both at a depth of three feet blow ground surface. Surface soil samples collected during the 1999 RI revealed total PCBs below the RAL. Transect 26 soils exceeding the RAL ranged from 10 to 220 mg/kg total PCBs at a single sampling location. Surface samples ranged from 10 to 11 mg/kg, while samples at 1- and 2-foot depths increased to 180 and 220 mg/kg, respectively. A sample at the 3-foot depth revealed non-detectable concentrations of total PCBs. At Transect 37, soils exceeding the RAL were found to possess 85 mg/kg total PCBs within a single sample collected at a depth of two feet blow ground surface. A deeper sample collected at a 3-foot depth revealed total PCBs below the RAL. A surface sample collected during the 1999 RI was below RAL. Soils exceeding the RAL will be removed from these transects to the extent feasible, as dictated by the physical and institutional constraints that exist at the site. The extent of remedial efforts will be balanced with the potential impacts to the surrounding river and riparian habitats.

The area, depth and total volume of affected floodplain soils at each work area are summarized below. It should be noted that these volumes assume that any clean overburden at Transect 9 and 37 will be excavated and disposed along with the underlying impacted sediments. At both cells, the upper 1-foot of overburden will be excavated and temporarily staged on plastic sheeting. A four-part composite sample will be collected from each stockpile and analyzed for total PCB concentrations pursuant to the Final FSAP and QAPP. If these soils are determined to be below the RAL, they will be utilized as backfill at the same excavation from which they originated. Also, the upper one foot of impacted soil from the Transect 26 will be excavated and segregated separately from deeper soils removed from the prior sample locations where RALs where exceeded.

Work Area	Area (Square (set))		Volume (cubic feet)			Potentially Exceed 50 mg/kg (otal
Transect 9 – North Cell	333	4	1332	49.3	61.6	Yes
Transect 9 – South Cell	364	4	1456	53.9	67.4	Yes
Transect 26	172	3	516	19.1	23.9	Yes
Transect 37	362	3	1086	40.2	50.3	Yes
SUBTOTAL			3190	162.5	203.2	

Prior to intrusive activities, ENTACT will photodocument and survey the areas identified for remedial action to document pre-excavation flora and ground surface elevations. Erosion control devices consisting of perimeter berms, and/or silt fencing to divert run-on and control potentially impacted work zone runoff will be constructed.

The work area at Transect 9 is on the east side of the river. Access will be made through the same temporary trail leading from the former CFC facility by which work at Transects 4 and 7 will be made.

The work area at Transect 26 is also on the east side of the river. The most direct access to this work area is via an existing dirt farm road that extends through the VanGilder Property from Tooley Road westward to a deer blind located on the west side of the river, opposite this work area. Equipment will be brought to the west side of the river via over-the-road trailer transport and off-loaded. It is anticipated that equipment can be moved to the east side of the River over a ford crossing that will be constructed in a suitable area south of Transect 26. Prior to intrusive work, silt fencing will be installed along the rivers edge. A ramp will initially be cut into the west bank of the river, using a trackhoe excavator. The ramp will be lined with cleated plywood sheeting to protect underlying soil and prevent soil loss to the river. The ford crossing will consist of 8 by 8 inch wooden timbers of sufficient length to span the riverbed, lashed together with chain. The timbers will be placed using the trackhoe, and anchored to the bank with additional chain. Once placed, additional silt fencing will be placed on the opposite bank. The rubber-tired tractor will be utilized to create a similar bank cut on the opposite of the river to allow access to the floodplain. This ramp will also be lined with cleated plywood sheeting. A path way between the ford crossing and the work area at Transect 26, approximately 80 feet, will be grubbed to allow access for the equipment.

If a suitable location for a ford crossing, an alternative access route will be utilized. The only alternative access to this work area is through the Bahl property via an existing driveway and trail that extends along the east side of the river from Bowen Road. This trail terminates at the northern end of the Bahl property. A new trail through the Vangilder property on the east side of the road would have to be cleared from the terminus of the Bahl property trail to the work area. The new trail would entail grubbing, clearing and trail improvements along an approximately 600-foot distance.

The work area at Transect 37 is on the west side of the river, on the O'Connell property. Access will be made by transporting equipment over-the-road to the adjacent Roman property, off-loading, and driving it to the work area. There is a poorly defined trail through a portion of wooded area on the Roman property leading to the work area. Access can be made with very little clearing or grubbing work, however, an existing metal culvert crossing of a small stream may need to be reinforced or replaced to accommodate equipment traffic.

The affected soils within each work zone will be removed using conventional excavation methods. Again, the equipment has been selected to minimize impacts to the riparian habitat adjacent to where the work areas are located, and along access routes into and out of the work areas. A small rubber-tired tractor with backhoe and front loader attachments will be utilized to excavate the

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affected soils. The excavated material will be live loaded into a lined dump trailer. A second rubber wheeled tractor will be used to haul the dump trailer either directly to the central staging/dewatering area (Transect 9), or to a location where the trailer will be transferred to an overthe-road vehicle (e.g., pick up truck), and hauled over public roads to the former CFC Facility and the central staging area (Transects 26 and 37). At Transect 26, the dump trailers will be used to haul excavated soils across the ford crossing to a location on the west side of the river. Thes soils may then be transferred to a lined roll-off container or onto a temporary staging pile and loaded onto an over-the-road dump truck for transport to the soil staging area. As previously indicated, the dump trailers that will be utilized for hauling the affected sediments will have a capacity of roughly 4 ½ to 6 cubic yards. Therefore, soils excavated at Transect 9 may be temporary staged to accommodate the excavation rate. Any soils that are staged will be placed in a bermed area lined with double layer of plastic sheeting. Any soils temporarily staged will be covered with plastic sheeting during precipitation events, or if they are to be left overnight. In addition, multiple dump trailers may be used and temporarily staged at the work area to accommodate the excavation rate.

Fugitive dust emissions during excavation will be controlled using water misting. Upon completion of excavation to the delineated depth, the excavation floor will be sampled by establishing a 25- by 25-foot grid system within the excavation area. A post-excavation grab sample will be collected from the center of each grid floor, and sidewall samples will be collected at a rate of one per 50 lineal feet of excavation sidewalls that are greater than 18 inches in height. The sampling methodology, sample parameters and analytical methods are described in detail in the Field Sampling & Analysis Plan, Appendix D of the Final RD/RA Work Plan.

Upon completion of excavation to the delineated depth, the excavation floor will be sampled by establishing a 25- by 25-foot grid system within the excavation area. A post-excavation sample will be collected in the center of each grid. If the remedial excavation is less than 25-foot by 25-foot, one post-excavation sample will be collected in the center of the excavation. These proposed sampling methodologies will provide a representative result for each excavation grid. Post-excavation samples will be submitted to a fixed laboratory for total PCB analysis (SW-846 Method 8082) (dry weight) with a confirmational level Data Quality Objective (DQO).

Upon completion of post-excavation sampling activities the excavated floodplain area will be backfilled to the pre-excavation surveyed grade with the appropriate soils. The top one foot of backfill will consist of clean topsoil. Due to the limited lateral extent of excavation, the backfilled area will be allowed to re-seed naturally from the surrounding indigenous vegetation. If required, riverbanks will be reconstructed to original grade. Each former floodplain excavation site will be photo-documented on completion of restoration activities.

#### 4.8 SOIL AND SEDIMENT TRANSPORT AND STAGING

Impacted soils and sediments excavated from the work areas located on the former CFC facility will be placed into a standard over-the-road dump truck lined with plastic sheeting, and hauled to the central dewatering/staging area. Impacted soil and sediment from the work areas located along the Shiawassee River will be hauled within lined and covered dump trailers. At those remediation areas accessible through the former CFC facility property, these dump trailers will be brought directly to the central dewatering/staging area. At the work areas which cannot be accessed through the former

CFC facility property, the loaded dump-trailers will hauled to accessible roadside locations where the trailers will be disengaged from the tractor, transferred to an over-the-road vehicle, and hauled over public roadways to the former CFC facility. The route of travel from each work area is summarized below.

. Work Area	Route of Public Roadway Travel to the Former GFC	Notes 2
Supplemental Transect S12-08	From Alternus Property, north and west on Popple Lane to Tooley Road, south on Tooley Road to M-59, east on M-59 to facility.	Assumes alternate access through Altemus property will be used.
Supplemental Transect S21-03	From Waters property, north on private drive to Bowen Road, west on Bowen to Tooley Road, south on Tooley Road to M-59, east on M-59 to facility.	Primary access route. Alternative will use same route from Bowen Road onto facility.
Transect 26	From Vangilder Property, south on Tooley Road to M-59, east on M-59 to facility.	Primary access route
Transect 26	From Bahl property, west on Bowen Road to Tooley Road, south on Tooley Road to M-59, east on M-59 to facility	Assumes alternate access through Bahl property will be used.
Transect 37	From Roman Property, north on Indian Camp Trail to W. Marr Road, west of Marr Road to N. Burkhart Road, south on Burkhart Road to W. Grand River Road, southeast of Grand River Road to M-59, east on M-59 to facility.	Alternative public roadway routes are available from Indian Camp Trail to facility.

All excavated material will be deposited into the appropriate dewatering cell as described in Subsection 4.4.3. Affected materials will be staged in separate piles of approximate 50 cubic yard quantities. The two cell dewatering area will be located at the north end of the former CFC facility area. Truck traffic to the dewatering area will be controlled and precautions such as roadway delineation and constant two-way radio communication with vehicle operators will be implemented to minimize the potential for accidental contaminant transport and dispersion by truck traffic. Good housekeeping practices will be employed at the truck loading and offloading areas to maintain control of the impacted material.

A non-organic sorbent material, such as fly ash, may be added to and mixed into the soil after a sufficient draining period to ensure that the soils and sediments pass the paint filter requirement for disposal purposes. However, total PCB composite waste profile sampling will be performed on the soil pile PRIOR to the addition of any absorbent material. Dried material will be sampled and tested for PCB concentrations to determine disposal options. Material staged in the dewatering area will be deemed dried and adequate for offsite transportation when a representative sample of the material passes a paint filter test.

All material will be transported off-site using licensed over the road dump trucks. The rate at which material is loaded for offsite transportation will be dictated by the rate at which the material is

dewatered. Mechanical efforts consisting of working (turning) the stockpiled material with a dedicated excavator may be employed to hasten the dewatering process.

#### 4.9 WATER TREATMENT

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As previously outlined, it is estimated that the total excavated volume of impacted soils and sediments will be approximately 460 cubic yards. Assuming a field capacity of 50 percent of a total soil porosity of 0.40, it is estimated that the saturated sediments will gravity drain to yield a volume of water 20 percent of the total saturated soil volume, which coverts to 92 cubic yards or 18,600 gallons of drained water that will be generated. In addition, one of the work areas is located within a ditch that has standing water throughout the year. This ditch will be de-watered prior to excavation of affected sediments. Depending upon the water level, it is estimated that there will be roughly 60,000 to 70,000 gallons of water contained within this ditch. Both the sump water from the dewatering operations as well as the ditch water will be treated through a portable on-site treatment system prior to river discharge.

A schematic layout of the proposed water treatment system is presented in Figure 7. Water will be transferred to a large settling tank to reduce suspended solids. The water will then be pumped from the top of the settling tank to a triple bag filter system to capture fine-grained material greater than 10 microns (Appendix D). The water will then be pumped to two, liquid-phase, granular activated carbon adsorption units (TIGG C-50 Adsorber or equivalent), connected in series (Appendix D). Each adsorber will contain 660 lbs of re-activated carbon. A flow valve will be installed between the bag filter system and the first adsorber to monitor flow rates.

PCB molecules readily adsorb to carbon due to their complex molecular structure. As PCB-impacted water enters the adsorber, the PCB molecules are adsorbed immediately in the first 6 to 12 inches of the carbon bed's Mass Transfer Zone. The C-50 Adsorber is 46 inches in diameter by 60 inches straight side and has a capacity of 463 gallons not including the top head. The actual carbon fill volume is about 250 gallons. The volume contains 20% actual carbon, 40% pore volume, and 40% volume between carbon particles. The rest of the volume is above the carbon level and is utilized when backwash occurs to reduce accumulated suspended fine-grained material. Approximate residence time for the C-50 Adsorber is 5 minutes at an input flow rate of 50 gallons per minute.

To prevent potential releases of PCB-impacted fine-grained material from the adsorbers, water will be filtered through a second bag filter system to capture fine-grained material greater than 0.5 microns before it is discharged to a final 20,000-gallon holding tank.

Prior to discharge, periodic water samples will be collected once this final holding tank is 80% full (i.e., 16,000 gallons). A sample port will be installed between the holding tank and a certified flow meter to collect representative water samples. To determine if discharge requirements have been achieved, water will be analyzed under USEPA Method SW-846 8082 (aqueous). The practical quantitation limit is approximately 0.5 parts per billion (ppb). If the sampled PCB concentration of treated water is greater than 0.5 ppb, then water will not be discharged. It may, however, be retreated and re-sampled, or properly disposed off site. Water confirmed non-impacted by laboratory

analysis will be pumped through the sample port and through the flow meter to track total daily discharge rates and quantities discharged to date before it is discharged to the river.

Water will be conveyed through this treatment system via a system of above ground piping and pumps. The water treatment area will be surrounded by a berm to minimize the inflow of water to the area after rainfall events and to contain water being treated in case of a breach in plumbing or storage tanks.

In anticipation of a greater volume of water that may need to be treated, an additional 20,000-gallon portable tank will be on-site during the duration of water management and treatment operations. Also, the Field Project Manager will locate at least one source (e.g., local vendor) for additional tankage, if necessary. The timing of ditch dewatering operations will be planned with careful consideration of local weather forecasts. Finally, the staging/dewatering area will be covered with tarps in the event of heavy precipitation.

#### 4.10 DISPOSAL

All excavated soils meeting landfill solid waste (paint filter) criteria will be transported off-site by truck to an approved Subtitle D (< 50 ppm PCBs) or TSCA (>50 ppm PCBs < 500 ppm PCBs) disposal facility. Prior to the addition of any inorganic drying agent, a four-part composite sample will be collected from each 50 yd³ pile and submitted for total PCB analysis pursuant to the approved FSAP and QAPP. If the total PCB result is greater than 50 mg/kg, the pile will be properly manifested and sent to the designated TSCA landfill for disposal. If the waste pile result is less than 50 mg/kg the pile will be sent to the designated Subtitle D landfill after notifying the landfill that it will be receiving sediments containing PCBs at concentrations of less than 50 mg/kg from the Site. If requested by the landfill, the <50 mg/kg analytical report will be submitted to the Subtitle D with the load.

The currently proposed State of Michigan disposal facilities are:

<50 mg/kg total PCBs	> 50 mg/kg tôtal PCBs
Sauk Hills Landfill (Allied Waste)	EQ
Canton, Michigan	Romulus, Michigan

Wastes generated during demobilization of the staging/dewatering area and the water treatment system as described in Subsection 4.11 below will be sampled and disposed of within the proposed Subtitle D or TSCA disposal facilities identified above.

#### 4.11 SITE RESTORATION AND DEMOBILIZATION

#### 4.11.1 Site Restoration

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Excavated upland areas will be backfilled to pre-excavation surveyed grade using clean fine-grained local backfill. For excavations in the floodplains or wetlands, a similar draining soil will be used to backfill the excavation to pre-excavation, surveyed grade. The upper one-foot of backfill will

analysis will be pumped through the sample port and through the flow meter to track total daily discharge rates and quantities discharged to date before it is discharged to the river.

Water will be conveyed through this treatment system via a system of above ground piping and pumps. The water treatment area will be surrounded by a berm to minimize the inflow of water to the area after rainfall events and to contain water being treated in case of a breach in plumbing or storage tanks.

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The currently proposed State of Michigan disposal facilities are:

<50 mg/kg total PCBs	> 50 mg/kg total PCBs
Sauk Hills Landfill (Allied Waste)	EQ
Canton, Michigan	Romulus, Michigan

Wastes generated during demobilization of the staging/dewatering area and the water treatment system as described in Subsection 4.11 below will be sampled and disposed of within the proposed Subtitle D or TSCA disposal facilities identified above.

#### 4.11 SITE RESTORATION AND DEMOBILIZATION

#### 4.11.1 Site Restoration

Excavated upland areas will be backfilled to pre-excavation surveyed grade using clean fine-grained local backfill. For excavations in the floodplains or wetlands, a similar draining soil will be used to backfill the excavation to pre-excavation, surveyed grade. The upper one-foot of backfill will consist of clean topsoil. On completion of backfilling, the area will be surveyed and compared to pre-excavation grade. The average reconstructed grade should differ no more than 0.2 feet from pre-excavation grade to ensure that pre-existing drainage has been maintained. All restored excavation areas will be photo-documented on completion of restoration activities.

All imported backfill soils will be sampled to ensure that they are free of contaminants and meet clean fill requirements prior to bringing the material on-Site.

consist of clean topsoil. On completion of backfilling, the area will be surveyed and compared to pre-excavation grade. The average reconstructed grade should differ no more than 0.2 feet from pre-excavation grade to ensure that pre-existing drainage has been maintained. All restored excavation areas will be photo-documented on completion of restoration activities.

All imported backfill soils will be sampled to ensure that they are free of contaminants and meet clean fill requirements prior to bringing the material on-Site.

Any construction materials used for the construction of the proposed PortaDam® or bypass flume within the river channel will be removed from the river channel after construction activities are concluded. River channel excavations will not be backfilled; the excavations will be allowed to naturally infill.

### 4.11.2 Water Treatment System Demobilization

Immediately upon the final discharge of water to the Shiawassee River, the water treatment system will be demobilized.

Solids will be removed from the bag filters and placed into lined roll-off boxes. These filtered solids will be sampled for total PCB concentration and disposed off as described in Subsection 4.10.

The activated carbon will be removed from the adsorbers and placed into lined-roll off boxes. The carbon will be sampled for total PCB concentrations and disposed of as described in Subsection 4.10.

The carbon vessels, bag filters housings, settling tank, holding tank, pumps and other equipment will be rinsed with clean water. Pursuant to the equipment supplier's request, the will be triple rinsed and wipe tested for PCBs prior to being returned.

Rinse waters from these cleaning activities will be containerized within a vac truck and sampled. If PCBs are not detected, the water will be discharged to the river. If PCBs are detected, they will disposed of at an off-site facility.

Ancillary piping and other expendable materials will be disposed of general refuse.

# 4.11.3 Soil Staging/Dewatering Area Demobilization

Immediately after excavated and dewatered soils and sediments are removed from the soil staging/dewatering area, they will be decommissioned. Any liner material not removed during soil removal will be removed and placed into lined roll-off boxes. Any underlying soils below the liner that has been visibly impacted by liner leakage and/or material spillage will be excavated and placed into the roll-off boxes. The underlying soil will be sampled for total PCB concentrations following the same post-excavation verification sampling protocols used for the remediation areas. Any soils that exceed 10 mg/kg will be excavated and placed into the roll-off boxes. The liner and soil will be disposed of according to the procedures outlined in Subsection 4.10 above.

### 5.0 REPORTING

### 5.1 DAILY, WEEKLY AND MONTHLY REPORTS

ENTACT will prepare and maintain daily work reports and other records to summarize all site activities performed during completion of removal activities. At a minimum, the daily work reports will include a listing of personnel on-site, equipment utilized, work performed, problems encountered (if any) and resolutions, and related information.

ENTACT will prepare status reports on a weekly basis to summarize activities performed at the site during the previous week.

ENTACT will also prepare formal monthly project progress reports that:

- Describe the actions which have taken place during the month;
- Include a summary of all results of sampling and tests and all other data received or generated during the month;
- Identify all documents completed and submitted during the month;
- Describe all actions which are scheduled for the next six weeks, and information regarding construction progress;
- Include any work plan modifications proposed/approved; and
- Describe activities undertaken in support of the community relations plan during the month and in the near future.

These monthly progress reports will be submitted to USEPA RPM and to the State Project Manager by the tenth day of every month. ENTACT will notify USEPA of the occurrence of any change in schedule described in the monthly progress report for the performance of any activity no later than five days prior to performance of the activity. An authorized representative of ENTACT will sign all reports (other than the monthly progress report described above).

### 5.2 EMERGENCY NOTIFICATION

Upon the occurrence of any event during the performance of the RA that ENTACT is required to report pursuant to CERCLA Section 103, 42 U.S.C. § 9603, or Section 304 of the Emergency Planning and the Community Right to-Know Act, 42 U.S.C. § 11004, ENTACT will notify the U.S. EPA within 24 hours of the onset of the event.

# 5.3 PHOTOGRAPHIC DOCUMENTATION

Photographs will be taken in order to serve as a pictorial record of work progress, problems, and mitigation activities. ENTACT's file at the site will contain color prints, labeled with the date and subject of the photograph. Photographic reporting data sheets, where used, will be cross-referenced with observation and testing data sheet(s), and/or construction problem and solution data sheet(s). Photographic documentation will be included in the RA Final Report.

### 5.4 REMEDIAL ACTION SUBMITTALS

During the implementation of the RA the following submittals will be provided to USEPA and the OEPA for review and/or approval pursuant to the schedule established in the SOW and the approved RA work plan:

- Final Design Document
- Draft Operation and Maintenance Plan
- Final Operation & Maintenance Plan

### 5.6 INSPECTION MEETINGS

During the implementation of the RA, at a minimum, the following meetings will be conducted at the site pursuant to the schedule in the approved SOW and the approved RA Work Plan:

- Pre-Construction Inspection
- Pre-Final Inspection
- Final Inspection

# 5.7 FINAL INSPECTION AND RA REPORTS

Within 15 days after completion of the Pre-final inspection, ENTACT will submit the Pre-final Inspection Report. Within 45 days following a fully successful final inspection, ENTACT will submit a written report documenting remedial action activities and requesting certification.

# 6.0 PROJECT SCHEDULE AND COST

The estimated schedule for performance of the RA tasks is presented in Figure 5. The estimated cost for the performance of the RA is \$425,000.

### 7.0 REFERENCES

ENTACT, 2003. Pre-Design Investigation Report, Shiawassee River Superfund Site, ENTACT and Associates, LLC, prepared for Johnson Controls, Inc. August 2003

Environmental Research Group, Inc. 1982. Polychlorinated Biphenyl-Contaminated Sediment Removal from the South Branch Shiawassee River. (MDNR).

Gradient Corporation, 2000. Evaluation of Recent PCB Data in the Shiawassee River, Pepper Hamilton LLP, by (Multifastner), April 14, 2000.

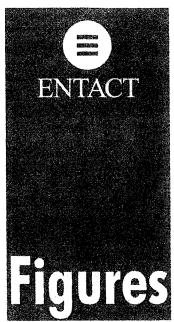
Malcolm Pirnie Engineers, Inc., 1997. Remedial Alternatives Feasibility Study, South Branch Shiawassee River Superfund Site, December 1997.

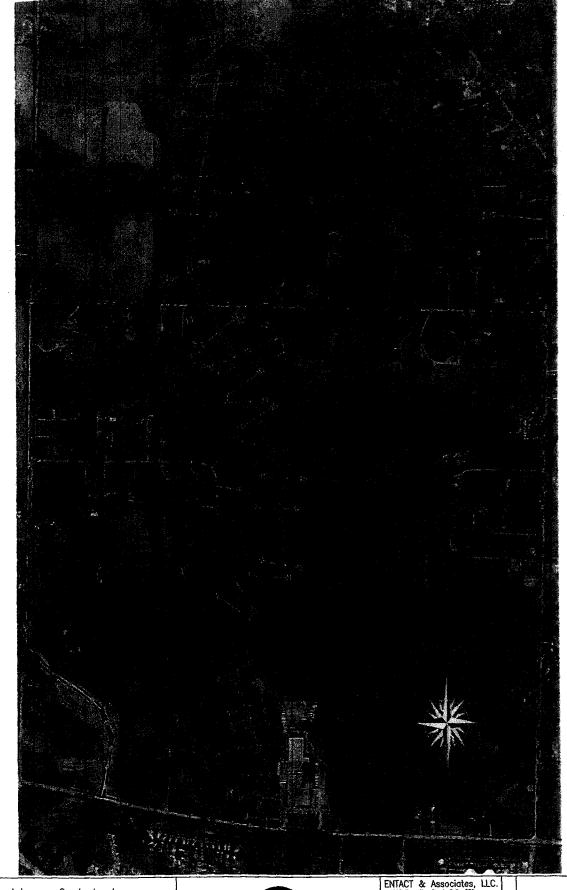
Tetra Tech EM, Inc., 2001. Final Supplemental Feasibility Study Report for Shiawassee River Site, Howell, Michigan. February 2001. USEPA Response Action Contract

Warzyn, Inc., 1992. Remedial Investigation Report South Branch Shiawassee River, Howell, Michigan, January 1992.

William Walsh, 2001. Letter dated, August 8, 2001 addressed to Mr. Tom G. Williams (USEPA) from William Walsh regarding Multifastener's Corporation's Comments on EPA's Draft Supplemental Feasibility Study.

United States Environmental Protection Agency.2002. EPA Administrative Order for the Shiawassee River Superfund Site Docket No. V-W-82-C-691, Issued April 28, 2002.





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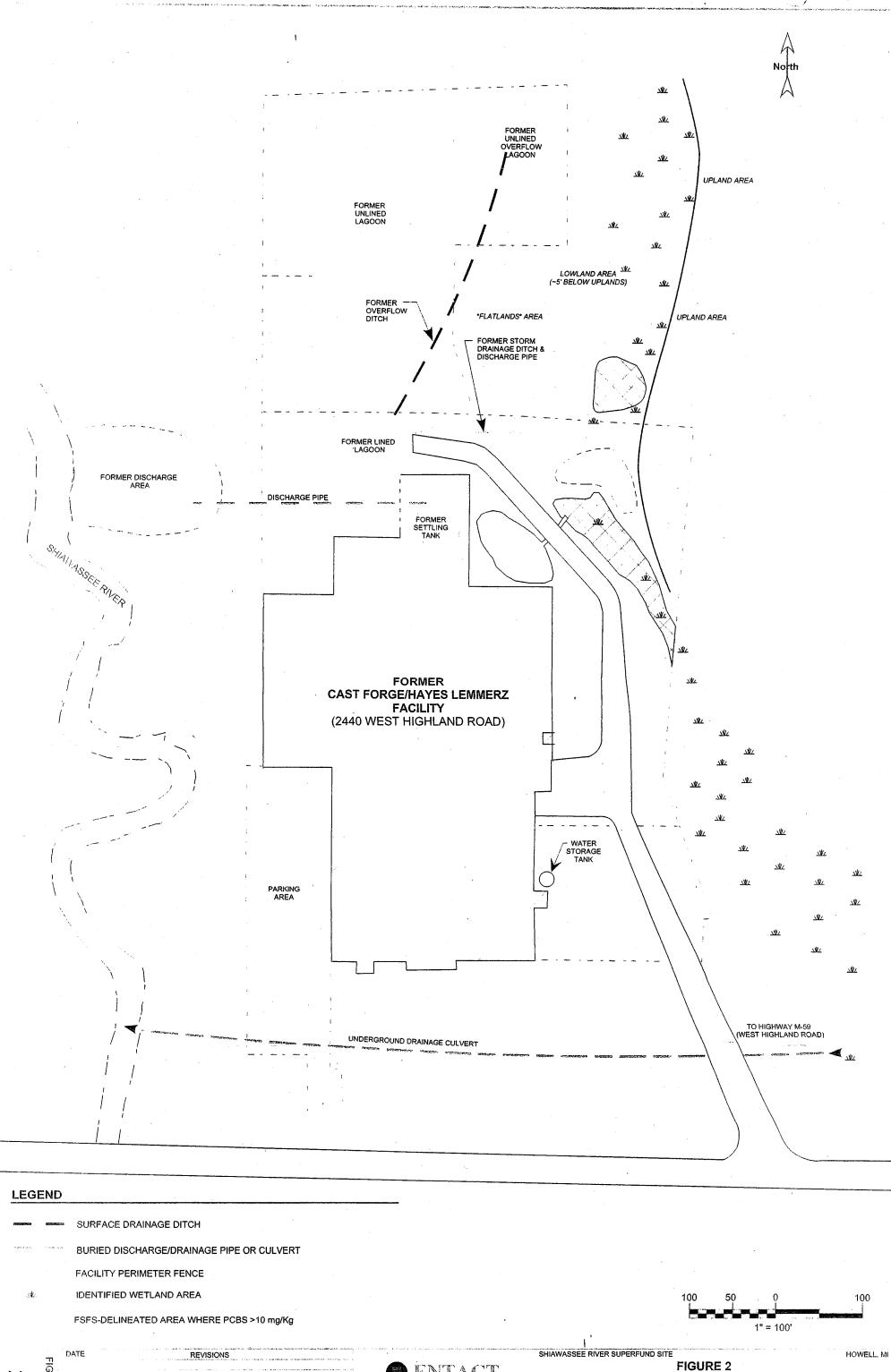
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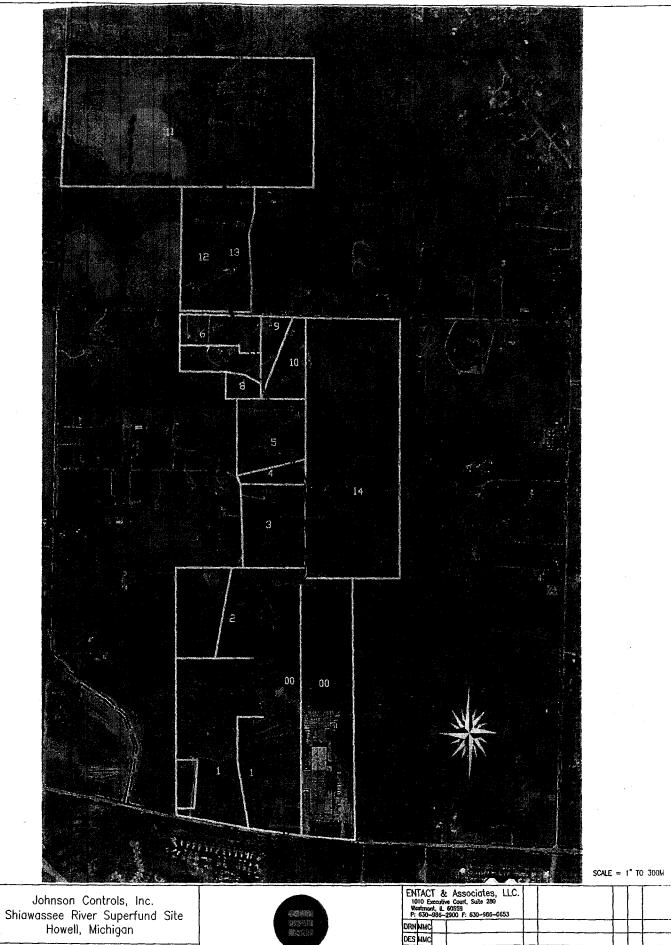
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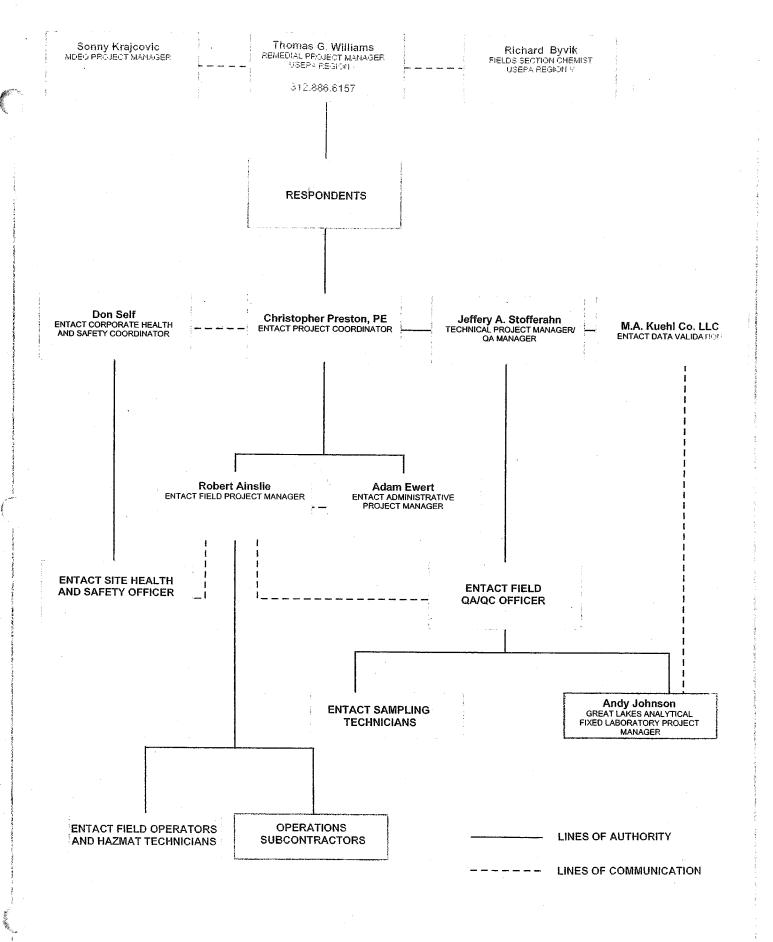


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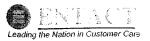


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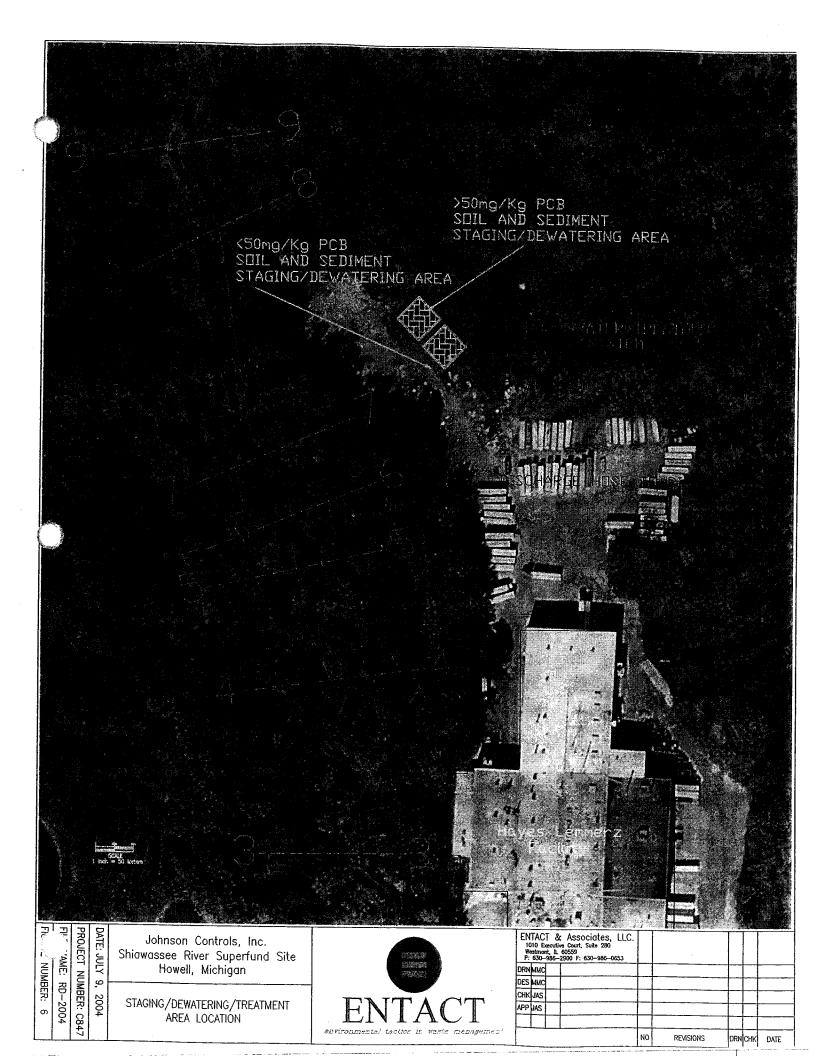
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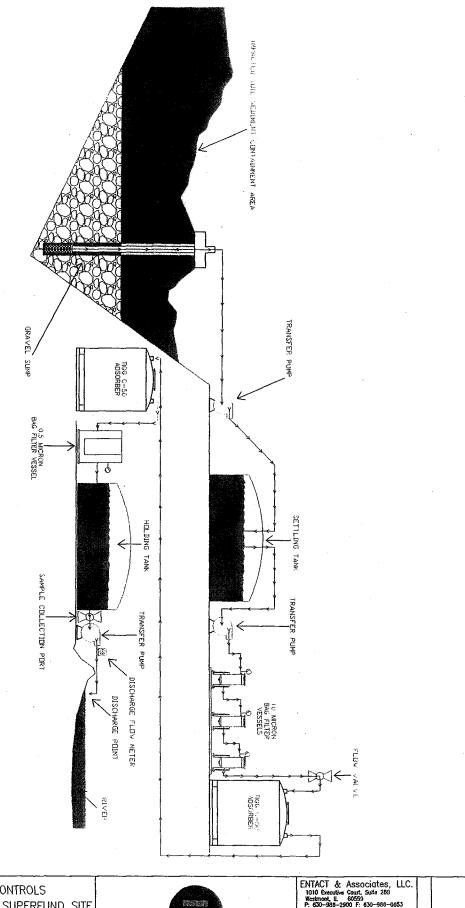
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Figure 5 Final Design Shiawassee River Superfund Site Project Schedule

Activity Description	Orig Early Dur Start	Early Finish	Total Float	2004	2005
Materials Management	in alama			PR MAY JUN JUL AUG SEP OCT NOV DEC JAY	I FEB MAR APR
1140 Construct Temporary Access	4 04OCT04	07OCT04	69d	Topotrust Tomores: Assess	
1820 Remove Impacted Sediments at Transect 4	1 07OCT04	07OCT04	89d	Construct Temporary Access	
150 Excavate Facility Soils	4 08OCT04	13OCT04	69d	Remove Impacted Sediments at Transect 4	
200 Isolate and Dewater Ditch	2 08OCT04	110CT04	87d	Excavate Facility Soils  Isolate and Dewater Ditch	•
330 Transport Impacted Materials to Staging Area	9 · 08OCT04	20OCT04	60d	Transport Impacted Materials to Staging Area	•
350 Gravity Dewatering of Saturated Materials	9 * 08OCT04	20OCT04	60d	Gravity Dewatering of Saturated Materials	
	9 * 08OCT04	200CT04	60d	Stabilize Impacted Materials for Paint Filter	•
400 Treat and Discharge Stockpile Water	9 * 08OCT04	20OCT04	60d	Treat and Discharge Stockpile Water	
1290 Remove Impacted Sediments at Transect 7	1 12OCT04	12OCT04	86d	Remove Impacted Sediments at Transect 7	
300 Remove Impacted Sediments at Transect 4	2 12OCT04	13OCT04	85d	■ Remove Impacted Sediments at Transect 4	
280 Excavate Flood Plain Soils at Transect 9	2 14OCT04	15OCT04	83d	Excavate Flood Plain Soils at Transect 9	
440 Backfill and Restore On-Site & Floodplain Areas	10 14OCT04	27OCT04	75d	Backfill and Restore On-Site & Floodplain Area	•
830 Remove Impacted Sediments at Transect S-12-08	1 15OCT04	15OCT04	83d	■ Remove Impacted Sediments at Transect S-12-08	
670 Excavate Flood Plain Soils at Transect 26	3 18OCT04	20OCT04	0	■ Excavate Flood Plain Soils at Transect 26	
840 Remove Impacted Sediments at Transect S-21-03	1 20OCT04	20OCT04	80d	■ Remove Impacted Sediments at Transect S-21-03	
850 Excavate Flood Plain Soils at Transect 37	2 21OCT04	22OCT04	73d	■ Excavate Flood Plain Soils at Transect 37	
680 Loadout of Stockpiled Soil Complete	0	29OCT04	73d	◆ Loadout of Stockpiled Soil Complete	
Puality Assurance / Quality Control					
110 Site Surveying	23 * 27SEP04	27OCT04	0	Site Surveying	
410 Ambient Air Monitoring	25 * 27SEP04	29OCT04	73d	Ambient Air Monitoring	
190 Confirmation Sampling of Excavated Areas	10 ° 07OCT04	20OCT04	79d	Confirmation Sampling of Excavated Areas	
420 Waste Profiling	9 * 08OCT04	20OCT04	60d	Waste Profiling	
450 Characterize Stockpiles for Disposal	9 * 08OCT04	20OCT04	60d	Characterize Stockpiles for Disposal	
ransportation and Disposal					
460 Off-Site Disposal of Non-TSCA (< 50 mg/Kg) Soils	16 14OCT04	04NOV04	69d	Off-Site Disposal of Non-TSCA (< 50 mg/K	a) Soils
470 Off-Site Disposal of TSCA (> 50 mg/Kg) Soils	16 14OCT04	04NOV04	69d	Off-Site Disposal of TSCA (> 50 mg/Kg) So	
ite Restoration				The control of the co	The state of the s
480 Remove Temporary Access Roads	5 21OCT04	27OCT04	0	Remove Temporary Access Roads	,
490 Final Grade Disturbed Areas	3 25OCT04	27OCT04	0	Final Grade Disturbed Areas	
roject Closeout			v	mai mai Ciade Distuibed Pieas	
550 Prepare Final Remedial Action Report	75 * 28OCT04	09FEB05	Ω		Prepare Final Remedial Action Report
600 Pre-Certification Inspection	0 28OCT04	.001 2000	. 0.	♦ Pre-Certification Inspection	riepaie Final nemedial Action Report
610 Pre-Certification Inspection Report	10 28OCT04	10NOV04	. 0	Pre-Certification Inspection Report	
S20 Final Inspection	0 18NOV04	.5.1.0 1.01	 n	♦ Final Inspection	
630 Completion of Final Remedial Action Report	0	09FEB05		▼ Fillal Inspection	♦ Completion of Final Remedial Action

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Finish date 09FEB05
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Run date 09JUL04
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DATE: JULY 9, 2004
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FILE "ME: RD 2004
DRJ NUMBER: 7

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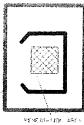
WATER TREATMENT SCHEMATIC



ENTACT & Associates, LLC. 1010 Executive Court, Suite 280 Westmont, IL 60559 P: 630-986-2900 F: 630-988-0853									
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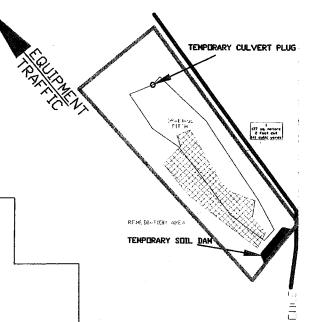






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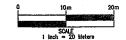
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LEGEND

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APPROXIMATE LIMITS OF EXCLUSION ZONE



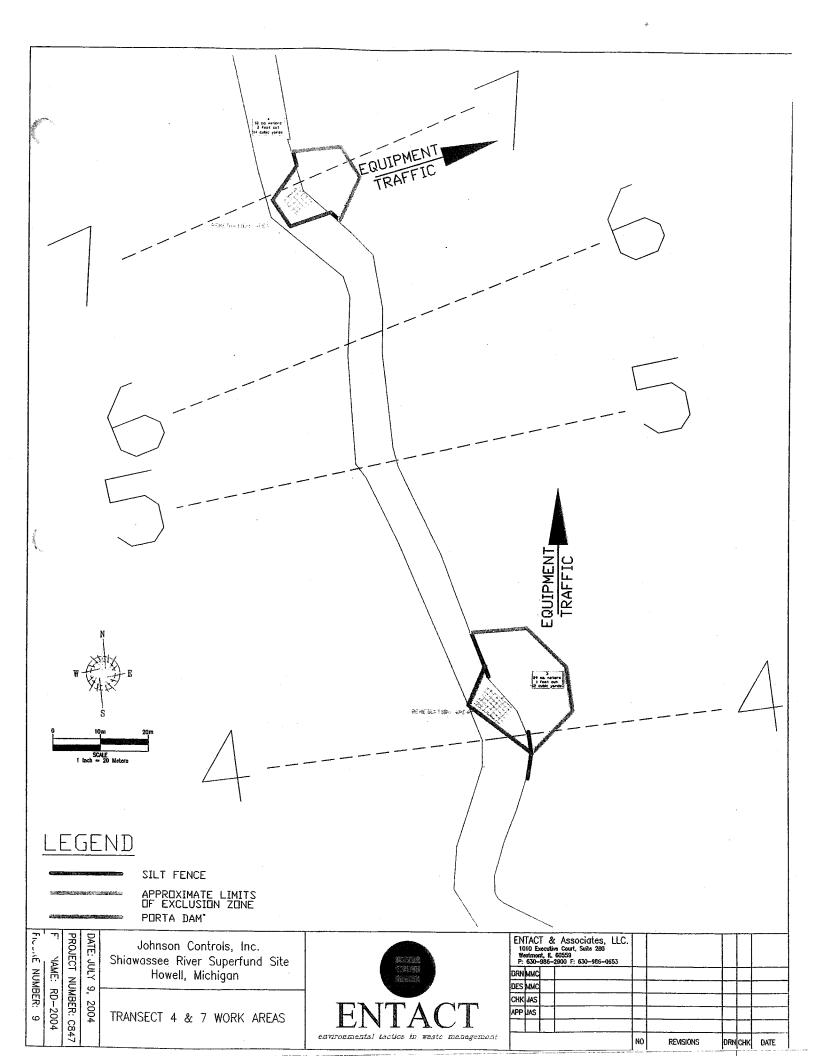
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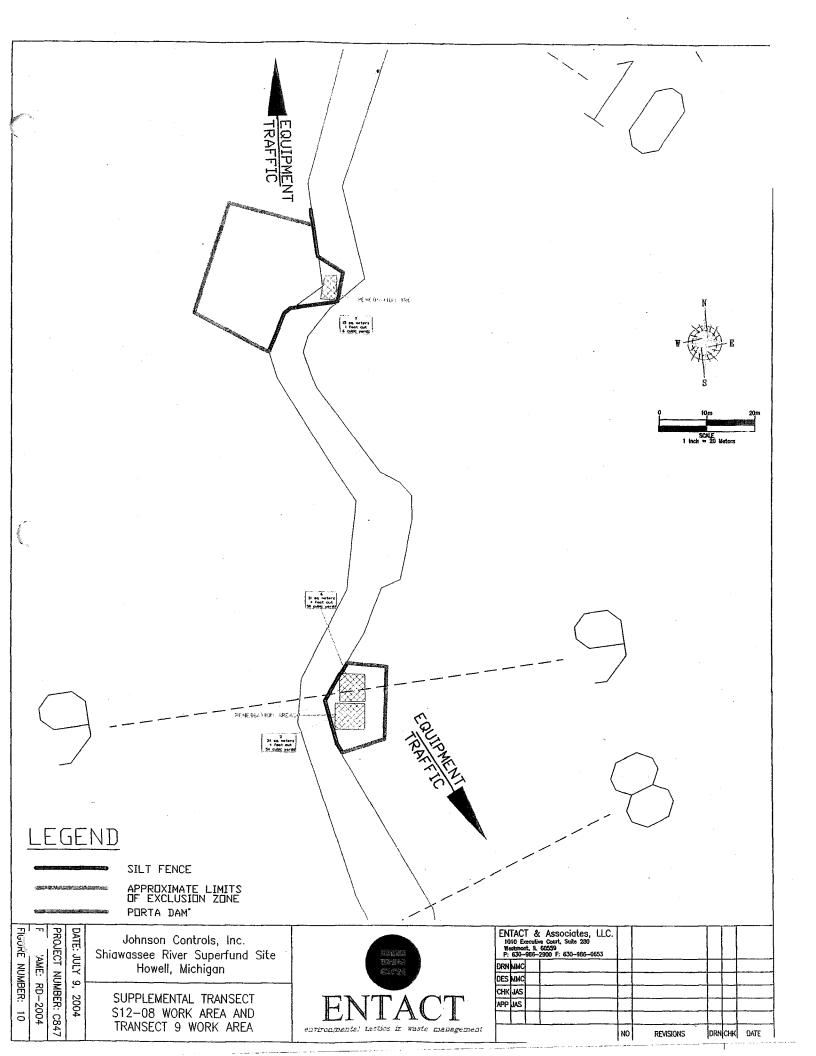
Johnson Controls, Inc. Shiawassee River Superfund Site Howell, Michigan

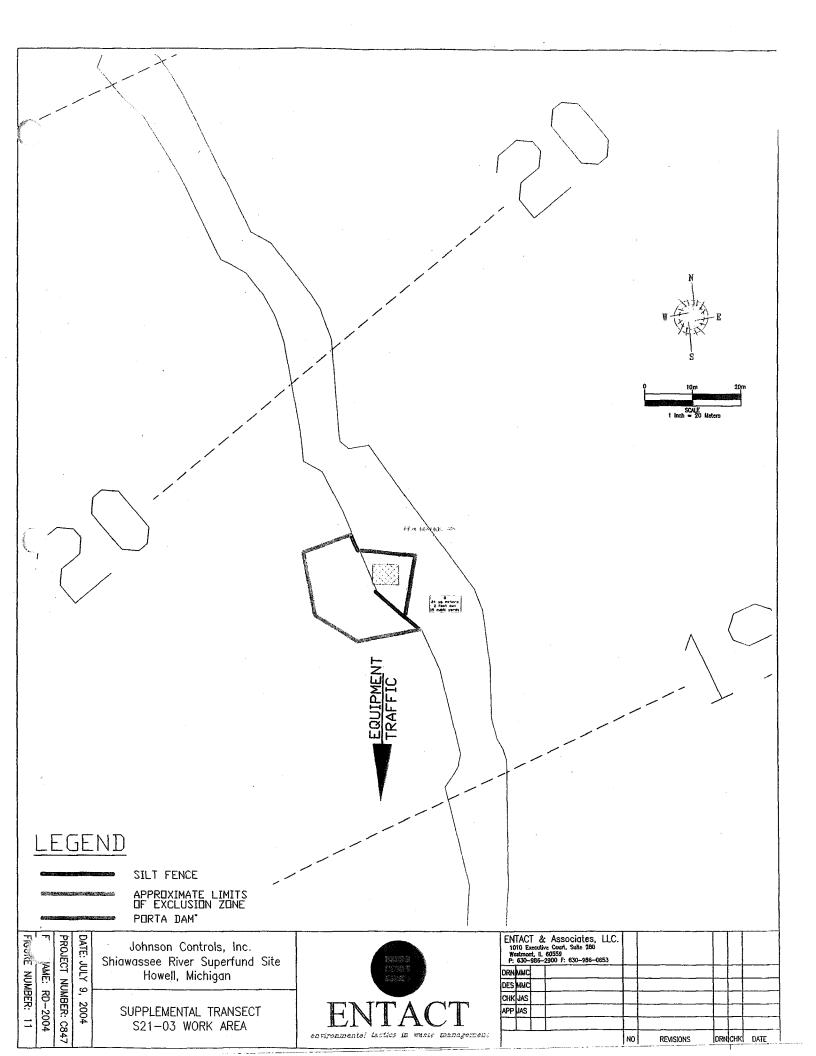
FORMER CFC WORK AREAS

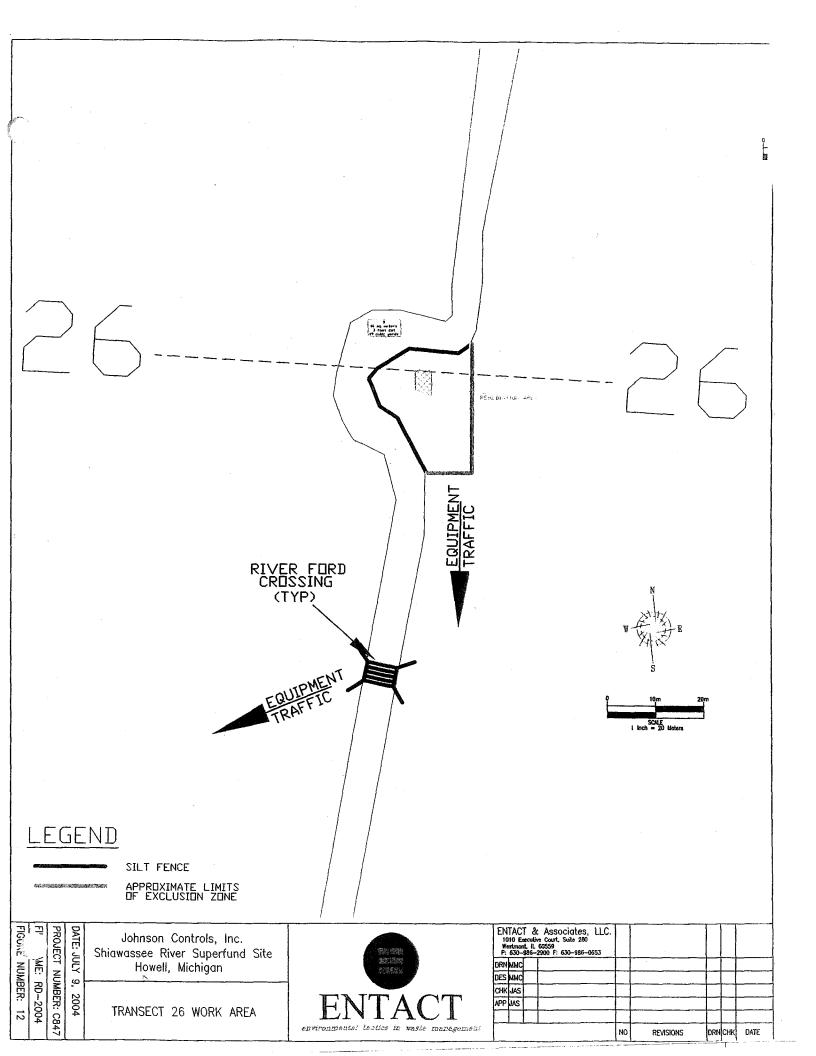


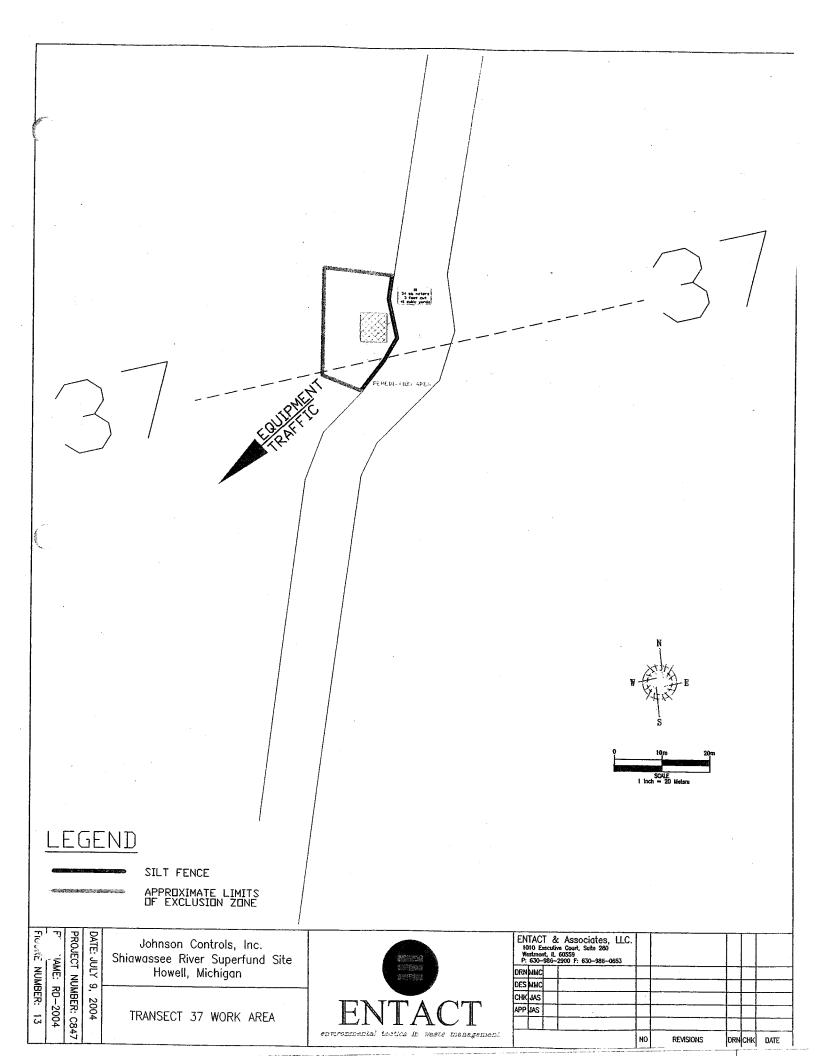
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Appendix A

# CONSTRUCTION QUALITY ASSURANCE PROJECT PLAN

## For The

## SHIAWASSEE RIVER SUPERFUND SITE

#### Prepared by:

ENTACT & Associates LLC 1010 Executive Court Suite 280 Westmont, IL 60559

> July9, 2004 Revision: 0

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#### 1.0 INTRODUCTION

This Construction Quality Assurance Plan (CQA Plan) has been prepared in conjunction with the RD/RA Work Plan, Johnson Controls, Inc. (JCI), Shiawassee River Superfund Site. This CQA Plan addresses quality assurance for site preparation activities, soil and sediment remediation, water treatment and management, soil and sediment management and disposal, and site restoration.

In the context of this CQA Plan, quality assurance refers to the means and actions employed to provide conformity of each of the specific components of the removal action with contractual and regulatory requirements. Quality control refers to those actions taken to provide for materials and workmanship that meet the requirements of the design plans and specifications. Quality control procedures are also provided by the manufacturers and installers of the various components used during the implementation of the approved remedy.

The main emphasis of this CQA Plan is careful documentation of the construction quality control process, from the selection of materials through site preparation activities, soil and sediment remediation, water treatment and management, and site restoration. The scope of this CQA Plan applies to manufacturing, shipping, handling, installing, and design guidelines. Detailed specifications for construction of the aforementioned components are provided as Attachment E-1 to this CQAP Plan.

The CQA Plan consists of a project description, a discussion of the project organization and responsibility, construction quality assurance activities including sample testing procedures, construction inspection, and documentation.

#### 2.0 PROJECT DESCRIPTION

#### 2.1 SITE DESCRIPTION

Refer to Section 1.2 of the Final Design document for a complete description of the Site.

#### 2.2 PROJECT OBJECTIVES AND SCOPE

The objective of the removal action design and construction is to remove contaminated soils and sediments from the Site. To complete this objective, site preparation activities will be completed prior to the start of remedial work. Concurrent with sediment removal activities, surface waters will be treated and managed. Management will include discharge of treated waters to the Shiawassee River. Soils will be de-watered as necessary, and sent for disposal pursuant to their PCB concentration. Site restoration activities will be completed to restore disturbed areas at the site.

Construction sequencing is outlined in the project schedule presented in Figure 5 of the Final Design document. The construction activities associated with the Work Plan are listed below with references to the detailed scope provided in the Final Design document.

- Site preparation activities: see Section 4.3 of the Final Design document.
- Soil and sediment remediation (removal): see Sections 4.4, 4.5, 4.6, and 4.7 of the Final Design document.
- Water treatment and management: see Sections 4.5 and 4.8 of the Final Design document.
- Soil and sediment management and disposal: see Sections 4.7 and 4.9 of the Final Design document.
- Site restoration activities: see Section 4.10 of the Final Design document.

#### 3.0 RESPONSIBILITY, AUTHORITY, AND QUALIFICATIONS

The responsibilities, authority, and qualifications identified in this CQA Plan are necessary to perform the removal action activities. A Project Organization Chart is presented in Figure 4 of the Final Design document.

#### 3.1 OWNER

#### 3.1.1 Definition

The Owner is responsible for removal action activities. For this project, Johnson Controls, Inc. (JCI) is the Owner.

#### 3.1.2 Responsibility and Authority

The Owner has the ultimate responsibility for completion of site preparation activities, soil and sediment remediation, water treatment and management, and site restoration, in accordance with the design plans and specifications. See Section 2 of the Final Design document for project organization and responsibilities.

#### 3.1.3 Qualifications

The selection of the Owner's representative is the responsibility of the Owner. The Owner's representative should be familiar with site preparation activities, soil and sediment remediation, water treatment and management, soil and sediment management and disposal, and site restoration, and regulatory requirements of the U.S. Environmental Protection Agency (USEPA) and the Michigan Department of Environment Quality (MDEQ).

#### 3.1.4 Submittals

The Owner and the Project Coordinator will submit required information to USEPA. Submittals for construction include:

- Design drawings and specifications.
- Quality Assurance Project Plan (QAPP).
- Field Sampling and Analysis Plan (FSAP).
- Health and Safety Plan (HASP).
- Monthly Status Reports.
- Record Drawings.
- Construction Completion Report.

#### 3.2 CONTRACTOR

#### 3.2.1 Definition

The Contractor (ENTACT) is the individual/firm responsible for Site preparation activities, soil and sediment remediation, water treatment and management, soil and sediment management and disposal, and Site restoration.

#### 3.2.2 Responsibility and Authority

The Contractor will be responsible for Site preparation activities, soil and sediment remediation, water treatment and management, soil and sediment management and disposal, and Site restoration. The Contractor may also be responsible for locating and transporting the required materials, and other work, as outlined in the specifications.

#### 3.2.3 Qualifications

The Contractor will be able to provide qualified personnel to meet the demands of the project. The Contractor will be qualified based on previously demonstrated experience and management ability. The Contractor will have experience with Site preparation activities, soil and sediment remediation, water treatment and management, soil and sediment management and disposal, and Site restoration.

#### 3.3 ENGINEER

#### 3.3.1 Definition

The Removal Action Engineer (Engineer) is the individual/firm responsible for review of the removal action, including reports, drawings, plans, and specifications.

#### 3.3.2 Responsibility and Authority

The Engineer is responsible for reviewing the associated drawings and specifications for the construction activities. The Engineer will attend the preconstruction meeting, prefinal inspection, and final inspection as discussed in Section 8 - Inspection Activities, of this CQA Plan.

#### 3.3.3 Qualifications

The Engineer must be a qualified professional engineer. The Engineer must be familiar with remedial design and implementation, water treatment methods and procedures, and applicable regulatory requirements.

#### 3.4 CONSTRUCTION QUALITY ASSURANCE MANAGER

#### 3.4.1 Definition

The Construction Quality Assurance (CQA) Manager is the person in charge of the construction quality assurance work. The CGQ Manager is identified in the Final Design document as the Quality Assurance (QA) Manager.

#### 3.4.2 Responsibility and Authority

The CQA Manager is responsible for observing and documenting activities related to Site preparation activities, soil and sediment remediation, water treatment and management, soil and sediment management and disposal, and Site restoration. The CQA Manager is ultimately responsible for seeing that the field observation and documentation is complete and for preparing a Construction Completion Report as outlined in Section 9 of this CQA Plan.

The CQA Manager will observe and document the activities in sufficient detail and with sufficient continuity to provide a high level of confidence that the work product complies with the design plans and specifications. The CQA Manager will also verify that installation requirements are met and that all submittals are provided. In addition, the CQA Engineer will perform and repeat tests, as necessary, to provide a high degree of certainty that the physical/mechanical characteristics of the Site preparation activities, soil and sediment remediation, water treatment and management, soil and sediment management and disposal, and Site restoration meet or exceed specifications.

The CQA Manager must maintain daily reports of Site preparation activities, soil and sediment remediation, water treatment and management, soil and sediment management and disposal, and Site restoration. These reports will include, at a minimum, visual observations and test results. In addition, these reports will summarize significant events and problems encountered and resolved.

#### 3.4.3 Qualifications

The CQA Manager must be experienced in the preparation of quality assurance documentation, including quality assurance forms, reports, and as-built drawings. The CQA Manager and Field Project Manager must be experienced in Site preparation activities, soil and sediment remediation, water treatment and management, soil and sediment management and disposal, and Site restoration.

#### 3.5 CONSTRUCTION QUALITY ASSURANCE (CQA) OFFICER

#### 3.5.1 Definition

The CQA Officer is the individual responsible for performing construction quality assurance activities related to the performance of the Work. This individual is identified in the Final Design as the On-Site QA/GC Officer.

#### 3.5.2 Responsibility and Authority

The CQA Officer is responsible for observing and documenting removal, treatment and management activities to verify conformance with the Drawings and Specifications. The CQA Officer is also responsible for performing quality assurance tests at the frequencies identified in the Technical Specifications. The CQA Officer will report directly to the Engineer and the CQA Manager, and will work independently of the FPM.

#### 3.5.3 Qualifications

The CQA Officer must be a qualified environmental and construction professional with demonstrated experience in testing and documentation.

#### 3.6 FIELD PROJECT MANAGER

#### 3.6.1 Definition

The Field Project Manager (FPM) is the individual personally in charge of the construction activities. The FPM will be assisted in administrative tasks by the Administrative Project Manager (APM).

#### 3.6.2 Responsibility and Authority

The FPM is responsible for coordinating on-site construction activities related to Site preparation activities, soil and sediment remediation, water treatment and management, soil and sediment management and disposal, and Site restoration. The FPM is ultimately responsible for seeing that construction activities are complete and that the necessary information is available for completion of the Construction Completion Report as outlined in Section 9 of this CQA Plan.

The FPM will coordinate the activities of any Subcontractors in sufficient detail and with sufficient continuity to provide a high level of confidence that the work product complies with the design plans and specifications. The FPM will also verify that all construction activities have been properly completed.

The FPM and/or APM must maintain daily reports of construction activities. These reports will include, at a minimum, visual observations and photographic documentation. In addition, these reports will summarize significant events and problems encountered and resolved.

#### 3.6.3 Qualifications

The FPM will be experienced in the coordination of Site construction activities and directing multiple Subcontractors. The FPM will be experienced in Site preparation activities, soil and sediment remediation, water treatment and management, soil and sediment management and disposal, and Site restoration.

#### 3.7 ANALYTICAL LABORATORY

#### 3.7.1 Definition

The Analytical Laboratory is a firm, independent of the Owner and the Contractors, responsible for conducting tests on the chemical properties of soil samples submitted by the COA Officer and/or CQA Manager.

#### 3.7.2 Responsibility and Authority

The Analytical Laboratory is responsible for conducting appropriate laboratory tests as directed by the CQA Officer and/or CQA Manager. The test procedures must be done in accordance with the test methods outlined in the QAPP. The Analytical Laboratory is responsible for providing report ready test results as outlined in the QAPP.

#### 3.7.3 Qualifications

The Analytical Laboratory must meet the qualifications outlined in the QAPP.

#### 3.7.4 Submittals

The Analytical Laboratory will submit test results to the CQA Officer and the CQA Manager as outlined in the QAPP.

### 4.0 SITE PREPARATION AND MOBILIZATION ACTIVITIES

Site preparation and mobilization activities involve site access, permitting, initial clearing and grubbing, access improvements, erosion/dust control, marking utilities, constructing soil staging/dewatering areas and water treatment system, mobilizing remediation equipment to each remediation area, and delineating excavation areas.

#### 4.1 OBSERVATION AND INSPECTION

Observation and inspection of Site preparation activities will be performed by the CQA Officer and will include the following:

- Obtain and verify access agreements with all affected property owners.
- Obtain MDEQ-required Substantive Requirements Documents for river channel and floodplain excavations and the discharge of treated waters that will be generated from remedial activities.
- Document that utilities have been cleared.
- Observe and document erosion control measures. Verify that erosion control construction materials are consistent with submittals.
- Observe and document initial and on-going clearing and grubbing.
- Observe and document dust control measures.
- Observe and document survey controls and construction staking layout.
- Observe and document access improvements. Verify temporary access construction materials (e.g., aggregate) are consistent with submittals.
- Observe and document soil dewatering/staging area construction. Verify that construction materials are consistent with submittals.
- Observe and document wastewater treatment system mobilization and installation.
   Verify that materials are consistent with submittals.
- Observe and document mobilization of excavating equipment to each specific remediation area. Verify that work area and equipment setup are consistent with submittals.

#### 4.2 CONSTRUCTION TESTING

No in-field or laboratory testing will be performed during documentation of Site preparation activities. The Pre-Design Investigation provided all necessary data for identifying and defining the removal action areas.

#### 4.3 FAILING TESTS OR MATERIALS

If upon inspection, a material or work product does not comply with plans and specifications, that material or work product will be replaced or re-worked to obtain the required properties.

#### 5.0 SOIL REMEDIATION

Soil remediation involves excavating and loading PCB-contaminated soil from floodplain and wetland areas on the project site.

#### 5.1 OBSERVATION AND INSPECTION

The CQA Manager or his designee will be present on Site on a full-time basis during remediation to document that removal action activities are performed in accordance with the design plans and specifications. The CQA Manager will be responsible for the following items:

- Observe and document excavation and loading of soils within the delineated excavation areas.
- Complete sampling of the excavation to document removal of the contaminated soil.
- In areas where potentially clean overburden is to be removed, oversee and document overburden stockpiling. Complete sampling of the excavated overburden to verify its use as backfill or its transport to the soil staging/dewatering area.

#### 5.2 CONSTRUCTION TESTING

Post-excavation soil sampling will be performed to document PCB concentrations in remaining soils. The CQA Manager is responsible for coordination of field sampling activities. Specific sampling and analysis methods associated with confirmation sampling activities are described in the FSP and QAPP.

#### 5.3 FAILING TESTS OR MATERIALS

If upon inspection, a material or work product does not comply with plans and specifications, that material or work product will be replaced or re-worked to obtain the required properties.

#### 6.0 SEDIMENT REMEDIATION

Sediment remediation involves the hydraulic isolation of affected portions of the riverbed, lowering of water levels within the isolated section, and excavation and loading of affected sediments.

Sediment remediation will also involve the isolation of the storm water ditch at the former CFC Facility, dewatering the isolated ditch by pumping the water, treating the water and discharging it downstream, and the excavation and loading of exposed contaminated sediments.

#### 6.1 OBSERVATION AND INSPECTION

Observation and inspection of sediment remediation and water treatment activities will be performed by the CQA Manager and will include the following:

- Observe and document isolation and dewatering of the storm water ditch at the former CFC Facility.
- Observe and document the hydraulic isolation of affected portions of the riverbed and lowering the water level within these isolated portions.
- Observe and document excavating and loading of contaminated sediments from the isolated storm water ditch at the former CFC Facility.
- Complete sampling of the excavated areas to document removal of the contaminated sediment.

#### 6.2 CONSTRUCTION TESTING

Post-excavation sediment sampling will be performed to document the PCB concentrations in remaining sediments within the river and the storm water ditch have been reached. The CQA Manager is responsible for coordination of field sampling activities. Specific sampling and analysis methods associated with confirmation sampling activities are described in the approved FSAP and QAPP.

#### 6.3 FAILING TESTS OR MATERIALS

If upon inspection, a material or work product does not comply with plans and specifications, that material or work product will be replaced or re-worked to obtain the required properties.

#### 7.0 SOIL DISPOSAL AND WATER TREATMENT

Soil disposal involves dewatering, testing, drying as necessary and loading soil for off-site disposal. Water Treatment involves pumping, treating, testing and discharging water during construction.

#### 7.1 OBSERVATION AND INSPECTION

Observation and inspection of soil disposal and water treatment activities will be performed by the CQA Manager and will include the following:

- Observe and document placement and segregation of soils and sediments in the staging/dewatering area.
- Complete disposal sampling of the soils.
- Observe and document the dewatering, and addition of drying agent to the soil.
- Observe and document pumping of water to the water treatment system, and operation of the system.
- Complete conformational sampling of the treated water to confirm that the discharge limit has been met.
- Observe and document discharge of treated water to the river.

#### 7.2 CONSTRUCTION TESTING

Sampling will be performed to characterize soils and sediments for disposal. Sampling will also be performed to document that no detectable PCBs are found in treated water prior to discharge to the river. The CQA Manager is responsible for coordination of field sampling activities. Specific sampling and analysis methods associated with confirmation sampling activities are described in the approved FSAP and QAPP.

#### 7.3 FAILING TESTS OR MATERIALS

If analytical results indicate that additional treatment is required to achieve non-detectable concentrations of PCB in the wastewater, the water will be re-treated and re-sampled until this goal is achieved, or the water will be sent for off-site disposal.

#### 8.0 SITE RESTORATION AND DEMOBILIZATION

Site restoration involves backfilling, grading, and/or replacing selected vegetation in areas disturbed during construction. Demobilization involves the demobilization of the soil staging/dewatering area and the water treatment system.

#### 8.1 OBSERVATION AND INSPECTION

Observation and inspection of Site restoration activities will be performed by the CQA Manager and will include the following:

- Observe and document backfilling and/or grading of excavation areas in the river floodplain.
- Observe and document backfilling and/or grading of areas on the former CFC facility, including the northern wetlands remediation area, and the upland portions of the storm water ditch, including placement of timber shoring.
- Observe and document removal of temporary ford crossings, and requisite bank restoration, including placement of timber shoring.
- Observe and document requisite bank restoration at river sediment remediation areas, including placement of timber shoring.
- Observe and document removal of temporary soil erosion control devices.
- Observe and document the demobilization of the soil staging/dewatering area.
   Conduct post-removal sampling.
- Observe and document the demobilization of the water treatment system. Conduct disposal sampling of solids wastes (filtered solids, carbon). Conduct verification sampling of the system components to verify that components are clean prior to offsite shipment.

#### 8.2 CONSTRUCTION TESTING

Sampling will be performed to characterize remaining soils beneath the soil staging/dewatering area. Disposal sampling will be performed of solid wastes generated by the water treatment system. Sampling will also be performed to verify that residual PCBs within the water treatment system are below action levels. The CQA Manager is responsible for coordination of field sampling activities. Specific sampling and analysis methods associated with confirmation sampling activities are described in the approved FSAP and QAPP, and the Final Design document.

#### 8.3 FAILING TESTS OR MATERIALS

If analytical results indicate that soils underlying the staging/dewatering area are impacted above the RAL (10 mg/kg total PCBs), these soils will be excavated and sent for disposal. Re-sampling and as necessary additional excavation will be conducted until PCB concentrations below the RAL are achieved. If analytical results indicate that the water system components are not clean, additional cleaning and re-sampling will be performed until conformational wipe samples are below action levels.

#### 9.0 INSPECTION ACTIVITIES

#### 9.1 PRE-CONSTRUCTION MEETING

A preconstruction meeting will be held at the Site prior to beginning construction. The preconstruction meeting will be attended by the representatives of the Owner, Hayes-Lemmerz, Contractor (ENTACT), MDEQ, and USEPA. This CQA Plan and the roles and responsibilities of each party will be reviewed and clearly understood by each party. The meeting will be documented by ENTACT and minutes will be transmitted to all participants.

#### 9.2 PREFINAL CONSTRUCTION INSPECTION

As the project is nearing completion, a prefinal construction inspection meeting will be held at the Site. The prefinal inspection will be attended by the representatives of the Owner, Hayes-Lemmerz, the Contractor (ENTACT), MDEQ, and USEPA. The prefinal inspection will consist of a walk-through inspection of the entire Site. The prefinal inspection will determine whether the project is being completed consistent with the contract documents. Any outstanding construction items noted during the prefinal inspection will be recorded. A prefinal inspection report will outline the outstanding construction items, actions required to resolve items, completion dates for these items, and the date for the final inspection.

#### 9.3 FINAL CONSTRUCTION INSPECTION

If needed, a final construction inspection meeting will be held at the Site upon completion of any outstanding construction items. The final inspection will be attended by the representatives of the Owner, Hayes-Lemmerz, Contractor (ENTACT), MDEQ, and USEPA. The final inspection will consist of a walk-through inspection of the project Site. The prefinal inspection report will be used as a checklist and will focus on the outstanding construction items.

#### 10.0 DOCUMENTATION

Construction activities associated with Site preparation, soil and sediment remediation, water treatment and Site restoration will be documented in accordance with the plans and specifications and this CQA Plan. The CQA Manager must document that requirements of this CQA Plan have been addressed and satisfied.

The CQA Manager must provide signed daily field reports, data sheets, and checklists to verify that monitoring activities have been carried out. The CQA Manager must maintain at the job Site a complete file of all documents that comprise or support this CQA Plan, including plans and specifications, checklists, test procedures, daily logs, and other pertinent documents.

Documentation will be completed using standard report forms to maintain consistency. Review and submittal procedures for each document are described in the following sections. Original documents will be stored by the Contractor.

#### 10.1 DAILY REPORTS

Daily field reports will be prepared by the CQA Manager to document the activities performed on-site. Daily field reports must include:

- Observation and testing summary.
- Documentation of construction problems and resolutions.

Documentation reporting that will be completed on a daily basis during the removal action and storm water management system improvements includes:

 Daily Construction Reports – Daily Construction Reports will be completed by the Contractor. Copies of the Daily Construction Reports will be maintained on-site for reference.

#### 10.1.1 Construction Problems and Resolutions

Sheets describing special construction situations will be cross-referenced with the Daily Construction Report, and must include the following information:

- A detailed description of the situation or deficiency.
- The location and probable cause of the situation or deficiency.
- How and when the situation or deficiency was found or located.
- Documentation of the response to the situation or deficiency.
- Final results of any response.
- Any measures taken to prevent a similar situation from occurring in the future.

#### 10.2 FIELD TESTING

Observation and testing data sheets will be prepared as needed to supplement the Daily Construction Report. At a minimum, these data sheets must include the following information:

- Date, project name, location, and other project identification information.
- Documentation of weather conditions.
- Reduced-scale site plan showing all current work areas and test locations.
- Descriptions and locations of ongoing construction.
- Equipment and personnel in each work area.
- Descriptions and specific locations of areas, or units, of work being tested and/or observed and documented (identified by lift and location).
- Locations where tests and samples were taken.
- Summary of test results.
- Calibrations or recalibrations of test equipment, and actions taken as a result of calibration.
- Off-site materials received, including quality verification documentation.
- Decisions made regarding acceptance of units of work, and/or corrective actions to be taken in instances of substandard quality.

Photographic reporting data sheets, where used, must be cross-referenced with these sheets. The photographs will serve as a pictorial record of work progress, problems, and mitigation activities. The basic file will contain color prints or digital photographs stored on compact disc (CD). If applicable, negatives will be stored in a separate file.

Documentation reporting that will be completed for field testing and sampling during removal action includes:

- Field Sampling Log Samples submitted for laboratory analysis will be recorded on the Field Sampling Log. The log will be maintained by the CQA Officer, and a copy will be attached to the Daily Construction Report. The CQA Manager will review the log on a weekly basis, at a minimum.
- Chain of Custody Each sample will be logged on a Chain-of-Custody (COC) form by the person completing the sampling. The CQA Officer will review the form to verify accuracy and completeness prior to submittal to the laboratory. The CQA Officer will attach a copy of each COC to the Daily Construction Report. Upon receiving the samples, the receiving person at the laboratory will sign and date the COC and will fax a copy of the signed COC to the CQA Manager.

Waste Disposal Log – A Waste Disposal Log will be completed to track soil disposal activities. The log will be completed by the Contractor. The disposal facility will send a copy of the disposal receipts to the Contractor after disposal to verify records. The log will be attached to the Daily Construction Report.

#### 10.3 INSPECTION AND OBSERVATION

Documentation reporting that will be completed for inspection and observation activities during the removal includes:

- In-Progress Inspection In-progress inspections will be completed as the work progresses. Results from the inspections will be summarized on the Daily Construction Report.
- Field Modification Form This form will be used to document field modifications.
   The form will be attached to the Daily Construction Report.
- Construction Photograph Log This form will be completed to record construction photodocumentation.

#### 10.4 HEALTH AND SAFETY

Documentation reporting that will be completed for Health and Safety considerations during removal action includes:

- Tailgate Safety Meeting A weekly tailgate (or toolbox) safety meeting will be held with all Site personnel prior to beginning work each week. A copy of the Tailgate Safety Meeting Form will be attached to the Daily Construction Report. The Tailgate Safety Meeting Form is included in Health and Safety Plan.
- Supervisor Safety Meeting Weekly safety meetings for supervision of staff will be held in conjunction with the Weekly Construction Meetings (Section 9.5). Safety issues will be documented in the meeting minutes.

#### 10.5 WEEKLY CONSTRUCTION MEETINGS

Weekly construction meetings will be held on-Site during remediation construction activities. The weekly meetings will include the following:

Review quality control issues and identify any areas or conditions requiring resolution or clarification.

- Identify any problem areas such as work deficiencies, work conflicts, or conditions affecting work.
- Make potential modifications to either the construction or quality control systems that would improve the final work product.
- Review applicable conditions of the Health and Safety Plan.
- Review work progress since previous meeting.
- Review field observations since previous meeting.
- Review construction schedule.
- Review documentation and submittals.
- Review field modifications.

Minutes from the Weekly Meeting will be completed and distributed to the appropriate parties within three working days.

#### 10.6 AS-BUILT DRAWINGS

As-built drawings of the remediation areas, staging areas, water treatment and Site restoration features will be prepared and included in the Construction Completion Report. The information will be presented on scale drawings both in plan view and in cross-section. At a minimum, the drawings will include the following:

- Record locations of remediation areas where soil and sediment was removed.
- Record location and dimensions of staging/dewatering area.
- Record locations and dimensions of water treatment system.
- Record grades of finished surfaces.
- Location of samples obtained for laboratory testing.
- Cross sections of remediation areas.

#### 10.7 CONSTRUCTION COMPLETION REPORT

Following the final inspection, a Construction Completion Report will be prepared and submitted to the Owner for review and approval prior to submittal to USEPA. The Construction Completion Report will confirm that the work has been performed in

substantial compliance with the design plans and specifications. The Construction Completion Report will include the following:

- Summary of construction activities.
- Observation and testing Data Sheets, including sampling locations.
- Construction problems and solutions.
- Photographic documentation.
- Changes from design and material specifications.

#### 10.8 FINAL STORAGE OF RECORDS

Final records of the construction activities will be maintained in the Contractor's files. Copies of reports and other submittals will be retained by the Owner and USEPA.

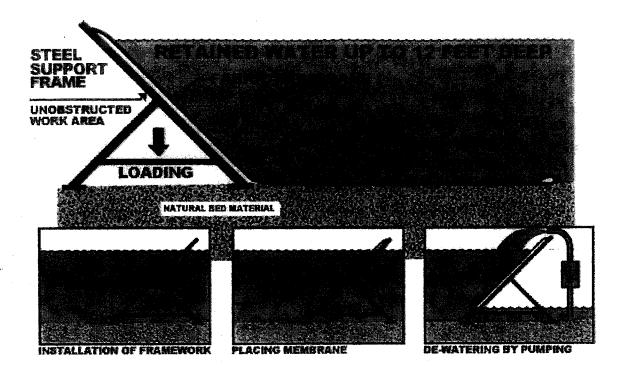








Portadam® is an innovative portable cofferdam, water diversion or fluid retention system for use in open water up to 12 feet deep. Portadam is used for construction, rehabilitation, flood protection and inspection projects in rivers, streams, lakes, reservoirs and other retaining areas. By utilizing a unique free standing steel support system and impervious fabric membrane, the Portadam technique allows many types of in-water construction to be accomplished in a "dry condition" without the need for excavation or fill, costly pile driving equipment, or time consuming sandbag dikes. The Portadam system consists of two main components; a welded tubular steel framework support and a flexible waterproof membrane permitting easy installation in any configuration and over uneven bed contours.



The Portadam® system utilizes the mechanical, resistive and flexible properties of modern synthetic fabrics to provide both temporary and semi-permanent barriers for fluid impoundment and control. The system support members are designed to transfer fluid loading to a near vertical downward load, thereby permitting installation on solid impenetrable foundations while eliminating the need for internal bracing which obstructs the work area. In contrast with driven sheet piling, this structure literally free-stands on the existing bed, eliminating the need for pile driving equipment, crossbracing and anchorage. Hydraulic loading on the membrane assists sealing and stability of the entire structure.



Click above links to access articles

See Portadam article on "Construction Site Turbidity Containment Alternative" in May/June 2000 issue of Land and Water Magazine, project profile feature article titled "Pipe Crews Keep

Dry While Working In River" in May/June 2000 issue of Erosion Control Magazine and project profile feature article titled "Historic Landmark Gets Docked" in June 17, 2002 issue of Constructioneer Magazine.

Call 1-800-346-4793 for more information or to find a Portadam dealer near you.





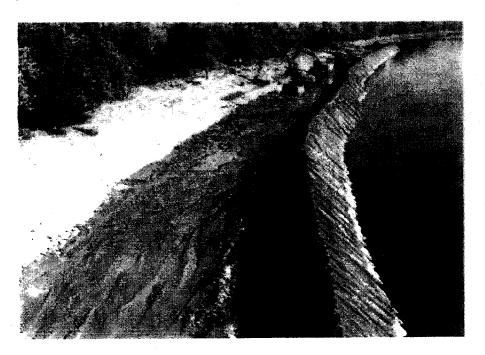
Portadam recommends Godwin Pumps for all your dewatering needs



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## Enviro-Remediation









Portadam offers an effective method of surrounding an in-water remediation site and separating the clean water from the work area while maintaining natural stream flow. In addition, by working in a dry area, excavated material dewatering is minimized.

This cofferdam method is clean and reusable, making it the most desirable and cost effective product for use in a multi-phase remediation project while offering clear, unobstructed access to the work area (lake or river bed.) No fill material is typically required, therefore the customer does not add more contaminated materials to the site to be remediated.

"Portadam" and its associated symbol are registered trademarks of Portadam, Inc.



## Silt Containment









Working in and around our Nation's waterways creates siltation and turbidity which, unchecked may have a negative impact on the marine environment. Satisfying Federal and State Water Quality Standards doesn't have to be a burden. Installing a PORTADAM system around your worksite and maintaining a slight negative pressure on the dam will prevent the escape of siltation. Our system works better than a floating silt barrier because a complete perimeter seal is achieved. Also, with the structural support system behind a temporary PORTADAM you don't have to worry about the barrier shifting in a current.

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Appendix

Appendix C

# DRAFT OPERATIONS AND MAINTENCE PLAN

### For The

## SHIAWASSEE RIVER SUPERFUND SITE

#### Prepared by:

ENTACT & Associates LLC 1010 Executive Court Suite 280 Westmont, IL 60559

(To Be Provided Upon Approval of the Design Document)

# **CANSORB®**

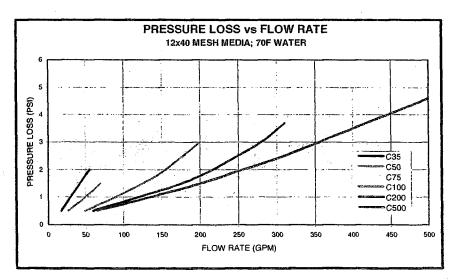
STEEL VESSELS

MODEL	MAXIMUM FLOW (GPM)	MAX PRESS (PSIG)	MAX TEMP (deg F)	FLG. INLET / OUTLET (IN)	DIAMETER / HEIGHT (IN)	STANDARD ADSORBENT FILL (LBS)	MAXIMUM ADSORBENT FILL (LBS)	SHIPPING WEIGHT - STANDARD FILL (LBS)
C-35	60	30	115	2/2	38 / 83	660	875	1380
C-50	90	30	115	3/3	46 / 96	1000	1600	2040
C-75	140	30	115	3/4	57 / 98	2000	2500	3420
C-100	200	30	115	3/4	68 / 102	3000	3600	4790
C-200	310	30	115	4/6	85 / 118	6000	6725	8410
C-500	500	50	140	6/6	96 / 139	8000	10000	14500

#### NOTES:

- 1) Do not exceed the maximum flow. For longer contact time, use lower flows.
- 2) Dry virgin activated or reactivated carbon provided as standard adsorbent.
- 3) Maximum adsorbent fill is based on a bed density of 29 lb/ft3.
- 4) Maximum adsorbent fill can differ based on variable bed density and alternate adsorbents.
- 5) Vessels are available in higher-pressure ratings in accordance with ASME Section VIII.
- 6) Pressure drops are based on a dense packed bed of activated carbon.

The CANSORB Series Modular Adsorbers are fabricated of carbon steel and provided with a high solids epoxy lining. Where process conditions dictate, the vessels can be fabricated from other materials such as stainless steel. In addition, a different lining can be substituted for the high solids epoxy. Media discharge and drain lines are provided with ball valves. The liquid collection system is designed to promote even flow distribution and thus, efficient adsorbent utilization. The liquid outlet is designed to maintain a liquid level above the carbon bed. Manways are 18 inches in diameter for easy access. The vessels are provided with lifting lugs and fork channels. Specifications and properties are subject to change without notice.

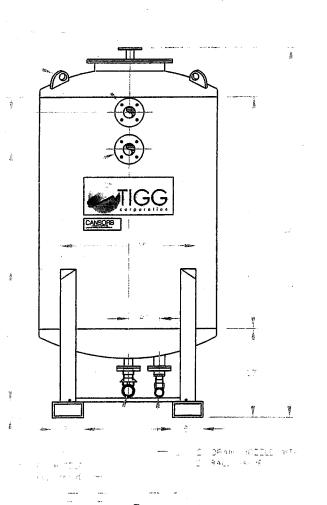


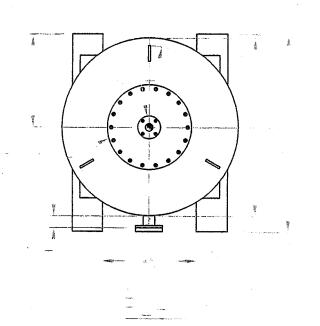


C-200 ILLUSTRATION



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V. G. MATERIAL ARBON TEL	LIQUID DRAIN ASSEMBLY SCHEDULE 30 PVC
ENIRS MICH. FALID (POX)	VOLUME OF VESSEL 62 FT. NOT INCLUDING TOP HEAD
ECTEMONITAIN ACKYLNIAING SNAML.	STANDARD/MAX CARBON FILL 1000 LBS 1600 LBS
THAT PREMICE OF	SHIP WT. OPERATING WT.STD.FILE 2040 LBS 5800 LBS
THE HERNEY I	CARBON TYPE TIGG 50 1240 LIQUID PHASE
INTERNAL CIREBIL MENA	MAX. OPERATING PRESSURE 50 PSIG
ACCORDING GOOD NOOMBE GOLDUG 30 PVC	MAX. OPERATING TEMP 115°

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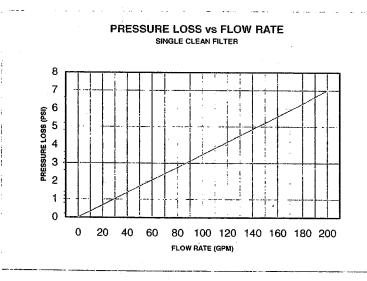
# TIGG BAG FILTER SYSTEMS

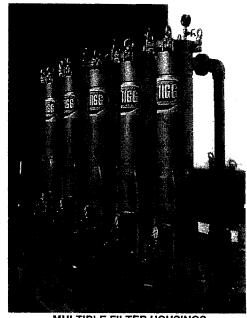
MODEL TIGGBF180	MAX FLOW (GPM) 180	MAX PRESS (PSIG) 150	MAX TEMP <sup>1</sup> ( <sup>0</sup> F) 250	FNPT <sup>2</sup> INLET/ OUTLET (IN) 2	DIAMETER/ HEIGHT(IN) <sup>3</sup> 7.7/42	FILTER AREA FT <sup>2</sup> 5.0			
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#### NOTES:

- 1) Limit of 200 °F when using polypropylene bags.
- 2) Flange connections can be provided.
- 3) Total height depends on placement of the band holding the legs.

This filter, equipped with the appropriate bag, can provide reliable and efficient performance in removing suspended solids and gelatinous particles from liquid streams. Multiple filter housings can be piped in parallel to treat flows greater than 180 gpm or provide duplicity for continuous operation while bags are being changed. All units are piped with inlet and outlet valves, pressure gauges and sample ports. The liquid to be filtered enters the housing above the bag and passes through the bag from the inside. The solids are collected on the inside of the bag, which is easily removed when the pressure drop across the filter is in the 20-25 psi range. The cover, with its swing bolt closure, is easily opened. The housing, legs and retainer screen are made of Type 316 stainless steel, which insures many years of operation. The seals are Buna N<sup>TM</sup> for the cover and Viton® for the basket. They are also offered in EPDM and PTFE. Bags made of polyester, nomex and PTFE are obtainable in sizes 0.5 through 200 microns. Units are available for sale or rental.





**MULTIPLE FILTER HOUSINGS** 









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# Appendix D

# APPENDIX C

